Upper San Gabriel River EWMP Group

June 2014

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

DRAFT ENHANCED WATERSHED MANAGEMENT PROGRAM WORK PLAN

Prepared for:

Upper San Gabriel River Enhanced Watershed Management Program Group
(County of Los Angeles, Los Angeles County Flood Control District, Cities of Baldwin Park, Covina, Glendora, Industry, and La Puente)

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County of Los Angeles
Los Angeles County Flood Control District
City of Baldwin Park
City of Covina
City of Glendora
City of Industry
City of La Puente

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Executive Summary

The Upper San Gabriel River Enhanced Watershed Management Program Group (EWMP Group) is comprised of the County of Los Angeles, Los Angeles County Flood Control District (LACFCD), and the Cities of Baldwin Park, Covina, Glendora, Industry, and La Puente (Group Members). Group Members began meeting in early 2013 to establish the EWMP Group and collaboratively develop an Enhanced Watershed Management Program (EWMP) for the Upper San Gabriel River Watershed (Watershed).

In developing the EWMP, Group Members are presented with unique advantages and challenges of the Watershed. First, the Watershed has relatively fewer Total Maximum Daily Loads (TMDLs) and relatively longer compliance timeline than other watersheds. Second, the Watershed generally contains sedimentary materials that tend to be permeable, especially near the northern portions of the valley adjacent to the San Gabriel Mountains where opportunities for regional infiltration facilities are favorable. By the same token, the permeable nature of the Watershed means surface water infiltrates rapidly during the dry weather, creating natural hydraulic separations with the lower portions of the Watershed and reducing potential contributions to downstream impairments. Furthermore, the receiving waters in the Watershed lack extensive monitoring data, which are at best sparse. Separately from the EWMP, the EWMP Group has developed a Coordinated Integrated Monitoring Program (CIMP) to obtain necessary water quality information and determine where hydraulic separations occur to guide EWMP Group's decisions for future adaptive management of the EWMP.

The EWMP is a requirement of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit), which was adopted by the Los Angeles Regional Water Quality Control Board (Regional Board) and became effective on December 28, 2012. This EWMP Work Plan presents the approaches for developing the EWMP that are consistent with the Permit.

IDENTIFICATION OF WATER QUALITY PRIORITIES

The water quality prioritization process of the Permit determines the water body-pollutant combinations (WBPCs) that will be addressed within the EWMP area. The permit defines several categories of WBPCs to be used:

- **Category 1** are those subject to an established TMDL;
- **Category 2** are those on the State Water Resources Control Board 2010 Clean Water Act Section 303(d) list or those constituents that have sufficient exceedances to be listed; and
- **Category 3** for those with observed exceedances, but too infrequent to be listed.

These WBPCs were further prioritized into subcategories based on the frequency, timing, and magnitude of exceedances.

WATERSHED CONTROL MEASURES

Development of the EWMP requires identification of best management practices (BMPs) expected to be sufficient to meet receiving water and effluent limitations set forth in the Permit. The overarching goal of BMPs in the EWMP is to reduce the impact of stormwater and non-stormwater on receiving water quality. The Permit requires EWMP Group Members to identify institutional and structural BMPs to achieve the objectives of the EWMP. Data on existing and planned watershed control measures, including both structural and institutional BMPs, were reviewed during development of the EWMP Work Plan. A process to identify additional BMPs is established in the EWMP Work Plan.

PROCESS FOR IDENTIFYING ADDITIONAL BMPS

The preliminary list of potential projects will be developed based on a review of existing watershed planning documents, including TMDL implementation plans, integrated watershed management plans and other planning documents provided by the EWMP Group.

Additional BMPs will be identified over the course of EWMP development. The EWMP Group has begun detailed spatial analysis of soil type, topography, land ownership, land use, hydrologic delineation, and environmental constraints. The next steps include conducting a water capture potential analysis and determining project location suitability. Once a list of potential projects are identified, they will be ranked based on criteria to be developed by the EWMP Group, such as cost effectiveness, stormwater capture goals, environmental constraints and impacts, public policy institutional issues, land ownership, and ease of implementation. Finally, projects will be further evaluated based on the results of the reasonable assurance analysis (RAA) and possible field investigations.

Minimum Control Measures and Institutional Best Management Practices

Group Members will continue to implement minimum control measures (MCMs) as required by the Permit. The Permit allows for the customization of these MCMs if proposed customizations perform at or beyond the level of effectiveness of the original requirements. Group Members may consider modifications of the MCMs based on RAA results and, if modifications are proposed, justifications for modifying that activity will be provided in the EWMP.

REASONABLE ASSURANCE ANALYSIS APPROACH

A key element of each EWMP is the RAA, which is used to demonstrate that the activities and control measures identified in the EWMP will result in attainment of the MS4 Permit limits. While the Permit prescribes the RAA as a quantitative demonstration that control measures, specifically BMPs, will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the EWMP. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their selection. Furthermore, the RAA considers the applicable compliance dates and milestones for attainment of the water quality based effluent limitations (WQBELs) and receiving water limitations (RWLs), and therefore supports BMP scheduling.

The RAA will use the Watershed Management Modeling System (WMMS), which was developed by the LACFCD through a joint effort with the United States Environmental Protection Agency. WMMS is a modeling system that incorporates three tools: (1) the watershed model for prediction of long-term hydrology and pollutant loading, (2) a BMP model, and (3) a BMP optimization tool to support regional, cost-effective planning efforts.

The proposed RAA approach is a predictive quantitative process that includes the following components:

1. Incorporates water quality priorities and identifies numeric goals to address them
2. Identifies opportunities for BMP implementation in the EWMP area
3. Evaluates effectiveness of potential BMPs on receiving water quality and jurisdictional loading
4. Identifies the combination of BMPs expected to attain numeric goals
5. Supports BMP scheduling over a timeline that addresses milestones cost-effectively

6. Supports the future adaptive management process to incorporate new data and experience gained during BMP implementation

STAKEHOLDER PARTICIPATION

The EWMP Group is strongly committed to providing the opportunity for meaningful stakeholder input throughout the development of the EWMP. The EWMP Group has participated in working groups that are developed to facilitate collaboration among stakeholders and the Technical Advisory Committee (TAC). The EWMP Group conducted a stakeholder meeting on May 5, 2014 to receive feedback from stakeholders on the progress to date and future plans. Community input will continue to be solicited during the course of the development of the EWMP.

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LIST OF ACRONYMS AND ABBREVATIONS

303(d) list	California State Water Resources Control Board 2010 Clean Water Act Section 303(d) list
BMP	Best Management Practice
CEDEN	California Environmental Data Exchange Network
CIMP	Coordinated Integrated Monitoring Program
County	County of Los Angeles (as a Municipality and MS4 Permittee)
CWH	Council for Watershed Health
DDT	Dichloro-diphenyl-trichloroethane
DO	Dissolved Oxygen
EWMP	Enhanced Watershed Management Program
EWMP Group	Upper San Gabriel River EWMP Group
GIS	Geographic Information Systems
Group Members	County of Los Angeles, Los Angeles County Flood Control District, and the Cities of Baldwin Park, Covina, Glendora, Industry, and La Puente
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LACSD	Los Angeles County Sanitation District
LID	Low Impact Development
LSPC	Loading Simulation Program - FORTRAN
LTA	Long Term Assessment
MCM	Minimum Control Measure
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
NIMS	Nonlinearity-Interval Mapping Scheme
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
Permit	Permit No. R4-2012-0175
PIPP	Public Information and Participation Program
RAA	Reasonable Assurance Analysis
Regional Board	Los Angeles Regional Water Quality Control Board
RWL	Receiving Water Limitation
SUSTAIN	System for Urban Stormwater Treatment and Analysis Integration
TAC	Technical Advisory Committee
TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin (Dioxin)
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
WBPC	Water Body-Pollutant Combination
WLA	Waste Load Allocation
WMMS	Watershed Management Modeling System
WQBEL	Water Quality Based Effluent Limitation
WQO	Water Quality Objectives

1 Introduction

1.1 BACKGROUND AND REGULATORY FRAMEWORK

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. R4-2012-0175 (Permit) was adopted November 8, 2012, by the Los Angeles Regional Water Quality Control Board (Regional Board) and became effective December 28, 2012. The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives (WQOs) set to protect the beneficial uses in the receiving waters in the Los Angeles region.

In June 2013, the County of Los Angeles (County), the Los Angeles County Flood Control District (LACFCD), and the Cities of Baldwin Park, Covina, Glendora, Industry, and La Puente (Group Members), collectively referred to as the Upper San Gabriel River Enhanced Watershed Management Program Group (EWMP Group), submitted a notice of intent to develop an Enhanced Watershed Management Program (EWMP) to fulfill the requirements of the Permit. This EWMP Work Plan establishes the basis for the EWMP that is consistent with Part VI.C.5-C.8 of the Permit, and:

(i) Prioritizes water quality issues resulting from stormwater and non-stormwater discharges from the MS4 to receiving waters within the EWMP area;
(ii) Identifies and implements strategies, control measures, and best management practices (BMPs) to achieve the outcomes specified in Part VI.C.1.d of the Permit;
(iii) Modifies strategies, control measures, and BMPs, as necessary, based on analysis of monitoring data to ensure that applicable water quality-based effluent limitations (WQBELs) and receiving water limitations (RWLs) and other milestones set forth in this EWMP are achieved in the required timeframes; and
(iv) Has provided appropriate opportunity for meaningful stakeholder input;

In addition, the EWMP Group will identify multi-benefit regional projects that retain (i) all non-stormwater runoff and (ii) all stormwater runoff from the 85th percentile, 24-hour storm event for the drainage areas tributary to the projects.

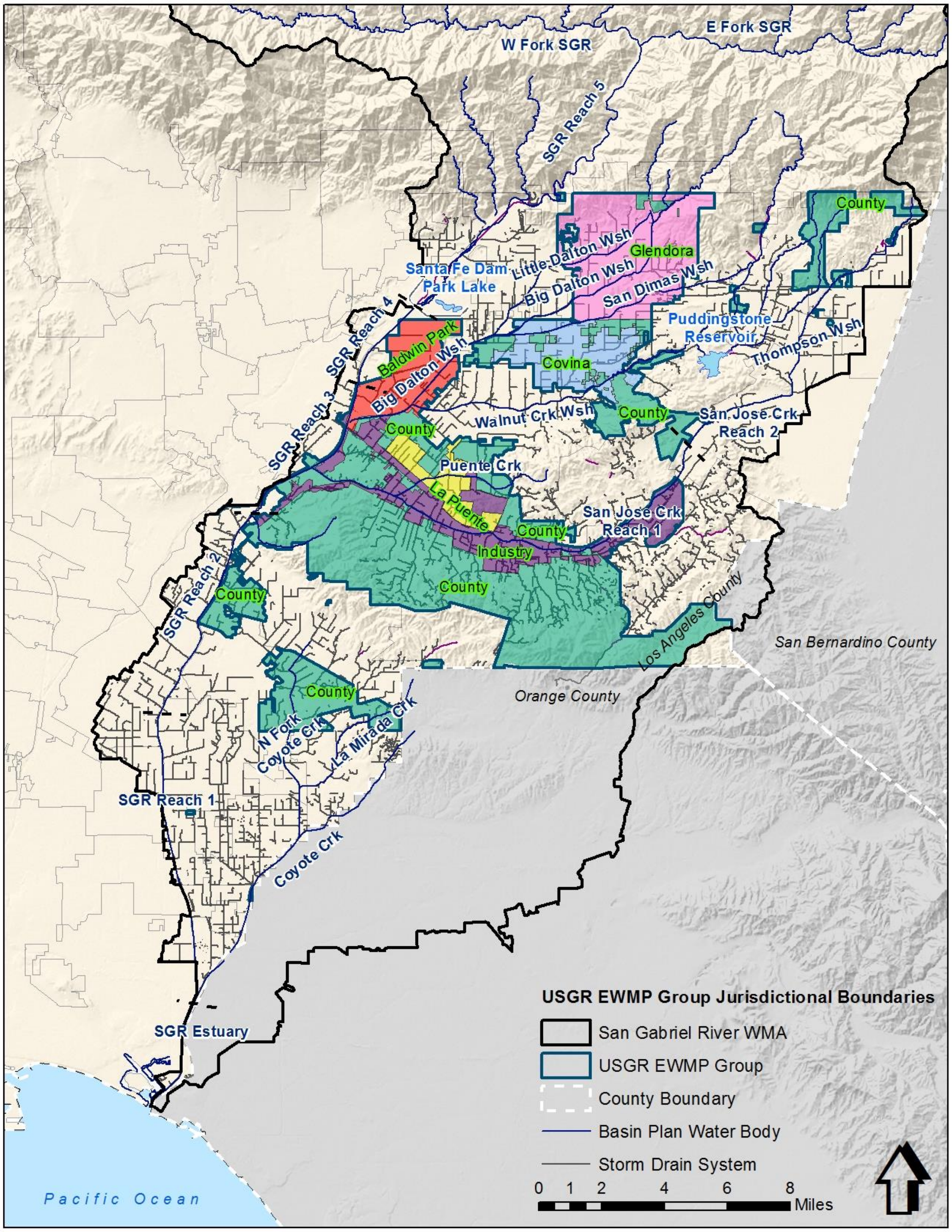
1.2 UPPER SAN GABRIEL RIVER EWMP GROUP

The San Gabriel River Watershed encompasses approximately 680 square miles of eastern Los Angeles County, northwest Orange County, and southwest San Bernardino County. The San Gabriel River has a main channel length of approximately 58 miles, and the main tributaries of the river are Walnut Creek, San Jose Creek, and Coyote Creek. The EWMP Group consists of five cities, unincorporated areas of the County, and the LACFCD. **Figure 1-1** depicts the geographical scope covered by the cities and the County in the EWMP Group. **Table 1-1** shows the land area distribution by each jurisdiction for the EWMP Group not including the Angeles National Forest. The LACFCD owns and operates the majority of flood control facilities within the San Gabriel River Watershed, while a small portion are owned and operated by the United States Army Corps of Engineers. The EWMP Group includes the LACFCD service areas, as depicted in **Attachment A, Figure A-2**.

Table 1-1
EWMP Group Land Area by Jurisdiction

Jurisdiction	Land Area (Acres)	Percent (%)
County of Los Angeles	40,812	59.4
City of Baldwin Park	4,335	6.3
City of Covina	4,481	6.5
City of Glendora	9,307	13.5
City of Industry	7,647	11.1
City of La Puente	2,207	3.2
LACFCD	N/A	N/A
Total Area of EWMP Group	**68,789**	**100**

Figure 1-1
Location of the EWMP Group within the Upper San Gabriel River Watershed Management Area



1.3 STAKEHOLDER PARTICIPATION

The EWMP Group is strongly committed to providing the opportunity for meaningful stakeholder input throughout the development of the EWMP. The EWMP Group has participated in working groups that are developed to facilitate collaboration among stakeholders and the Technical Advisory Committee (TAC). The EWMP Group conducted a stakeholder meeting on May 5, 2014 to receive feedback from stakeholders on the progress to date and future plans. An additional stakeholder meeting to discuss progress is planned for early 2015 when potential projects in the Draft EWMP have been identified. Group Members will continue to disseminate informational flyers to solicit community input during the course of EWMP development. Stakeholder collaboration will continue throughout implementation of the EWMP.

2 Watershed Characterization

2.1 GEOGRAPHIC DESCRIPTION

The San Gabriel River Watershed encompasses approximately 680 square miles of eastern Los Angeles County and has a main channel length of approximately 58 miles. Its headwaters originate in the San Gabriel Mountains with the East, West, and North Forks of the river. The river flows through residential, commercial and industrial areas before reaching the Pacific Ocean in Long Beach. The main tributaries of the river are Walnut Creek Wash, San Jose Creek, and Coyote Creek. The EWMP area is located in the upper portion of the San Gabriel River Valley. As shown in **Figure 1-1**, water bodies within the EWMP area include:

- Thompson Wash
- Little Dalton Wash
- Big Dalton Wash
- San Dimas Wash
- Walnut Creek Wash
- Puente Creek
- San Jose Creek Reaches 1 and 2
- San Gabriel River Reaches 2, 3, 4, and 5
- North Fork of Coyote Creek

Flowing receiving water downstream of the EWMP area include:

- San Gabriel River Reach 1
- Coyote Creek
- San Gabriel River Estuary

Additionally, there are unnamed tributaries draining unincorporated County areas that discharge into Coyote Creek and Puddingstone Reservoir.

2.1.1 Geology

The geology of the San Gabriel River Watershed can be subdivided into three basic types of geologic materials:

- Bedrock materials in the steep upper portion of the watershed in the Angeles National Forest in the San Gabriel Mountains
- Sedimentary materials comprising valley fill emanating from alluvial fans from the San Gabriel Mountains
- Marine sedimentary deposits which comprise the San Jose Hills and Puente Hills

The bedrock materials of the San Gabriel Mountains consist of igneous and metamorphic rocks, which were uplifted by faulting to form steep ridges and valleys in the upper portion of the watershed. These rocks are generally impermeable and transmit only small quantities of water through fractures.

The sedimentary materials which comprise the flatter areas of the valley are comprised of alluvial fan and fluvial deposits. These deposits tend to be very permeable, especially near the northern portions of the valley adjacent to the San Gabriel Mountains. The valley fill materials consist of interbedded silt, sand and gravels. The numerous gravel pits in the valley are located in these deposits. The deposits represent the most promising areas for regional infiltration facilities. During dry-weather, surface water from the San Gabriel Mountains infiltrates rapidly into these deposits, providing a hydraulic separation of the lower portions of the watershed. A goal of the monitoring in the Coordinated Integrated Monitoring Program (CIMP) will be to establish when the EWMP area is hydraulically connected to the downstream water bodies.

The sedimentary deposits which form the upland areas of the San Jose Hills and Puente Hills consist of marine sandstone, siltstone, and shale. Because these deposits are fine-grained and consolidated, they have relatively low permeability. Aside from the disadvantages of higher elevation and relatively steep slopes, they represent poor areas for infiltration because of their expected low permeability.

2.1.2 Groundwater Basins

The alluvial and fluvial valley-fill deposits in the flatter areas of the watershed form two groundwater basins which underlie the EWMP area. Most of the area of Covina, Baldwin Park, and Glendora overlie the Main San Gabriel Groundwater Basin. This groundwater basin is an important source of water supply, with a typical production of 250,000 acre-feet of water per year. The basin is adjudicated and actively managed by the Main San Gabriel Watermaster. Groundwater flow is generally from east to west across the basin, then southward into the Central Basin through the Montebello Forebay. There are numerous existing facilities for capture of stormwater operated by LACFCD, the largest being along the San Gabriel River and Santa Fe Dam. The groundwater contains a number of contaminant plumes stemming from past agricultural and industrial practices, including nitrate, volatile organic compounds, and perchlorate.

The Puente Basin is a smaller groundwater basin roughly co-located with the City of Industry south of the San Jose Hills. Groundwater flow is generally westward, flowing into the Main San Gabriel Basin near Highway 605. The Puente Basin is also adjudicated and managed by a three-person watermaster committee. The average production from this basin is approximately 1,000 acre-feet per year. Due to the poor water quality of the groundwater, it is used for non-potable purposes including blending with reclaimed water, construction water, and irrigation.

2.2 RAINFALL CONDITIONS

The semi-arid climate of the Los Angeles region creates distinct hydrology differences between the dry and wet seasons. The amount of rainfall is a key variable for water quality conditions and pollutant loadings from MS4 areas. To support EWMP development, a rainfall analysis was performed by aggregating data from available rain gages across the San Gabriel River Watershed. For comparison, other watersheds were also analyzed. Two key metrics were evaluated: (1) total annual rainfall, and (2) average rainfall per wet day (with wet days defined as days with rainfall totals greater than 0.1 inches). The second metric serves as a coarse indicator of rainfall intensity. The analysis covered 25 water years from 1987 through 2011—the total rainfall for each precipitation gage was aggregated into annual totals based on water year (i.e. previous October through current September).

For EWMP development, the last 10 years of available data will be used to develop the RAA (Section 5). As shown in **Table 2-1** and **Table 2-2**, the most recent 10 years were compared to the overall 25 years of record. Both the average and 90th percentile values were compared across the 10- and 25-year records.

For San Gabriel River, water year 2008 is a representative average year based on both rainfall metrics (yellow cells in **Table 2-1** and **Table 2-2**), while water year 2003 was proximal to the 90th percentile values for San Gabriel River in terms of rainfall per wet day, which is a conservative metric for BMP planning (see green highlighted cells in **Table 2-2**). As such, for the San Gabriel River, water year 2008 is a representative year for average conditions and water year 2003 is a representative year for critical wet conditions, which will be important boundary conditions for the RAA (Section 5).

Table 2-1
Annual Rainfall Totals (Water Years 2002–2011 vs. 25-year Average)

Water Year	Average Rainfall Totals (inches/year)				
	Ballona Creek	**Dominguez Channel**	**Malibu Creek**	**San Gabriel River**	**Los Angeles River**
2002	25.4	19.1	28.1	30.6	30.5
2003	17.1	13.9	20.8	23.0	20.4
2004	10.2	8.1	9.2	13.7	11.2
2005	39.3	28.4	42.6	49.6	46.7
2006	14.1	9.8	16.9	17.9	17.5
2007	4.3	3.1	6.8	6.4	5.8
2008	13.2	11.9	18.6	19.4	17.5
2009	9.6	8.5	12.3	14.6	12.5
2010	16.8	14.9	20.3	24.1	20.5
2011	21.2	18.5	25.3	28.5	25.7
Avg. (1987-2011)	15.9	12.5	18.4	20.7	19.2
90th Percentile (1987-2011)	30.8	22.9	34.7	37.8	36.9

Yellow highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Green cells have the smallest difference from 90th percentile of the 25-year record.

Table 2-2
Average Rainfall Per Wet Day (Water Years 2002–2011 vs. 25-year Average)

Water Year	Average Rainfall Per Wet Day (inches/wet day)				
	Ballona Creek	Dominguez Channel	Malibu Creek	San Gabriel River	Los Angeles River
2002	0.36	0.32	0.41	0.42	0.36
2003	0.79	0.66	0.88	0.92	0.84
2004	0.61	0.48	0.61	0.66	0.58
2005	0.98	0.69	1.03	1.07	1.03
2006	0.53	0.41	0.61	0.64	0.61
2007	0.31	0.27	0.39	0.41	0.37
2008	0.56	0.52	0.68	0.76	0.71
2009	0.49	0.48	0.56	0.65	0.57
2010	0.64	0.60	0.71	0.82	0.72
2011	0.62	0.58	0.73	0.76	0.70
Avg. (1987-2011)	0.59	0.52	0.67	0.72	0.66
90th Percentile (1987-2011)	0.78	0.66	0.91	0.97	0.89

Yellow highlighted cells are the two years in each basin with the smallest difference from the 25-year average. Green cells have the smallest difference from 90th percentile of the 25-year record.

3 Identification of Water Quality Priorities

Water quality priorities establish the goals for the EWMP, and support prioritization and scheduling of EWMP control measures. The Permit outlines specific set of priorities based on TMDLs, State Water Resources Control Board 2010 Clean Water Act Section 303(d) list, and monitoring data. Data were obtained from numerous sources and analyzed to evaluate exceedances of WQOs. Based on the analysis, WBPCs were identified and then classified in one of the three categories as defined in the Permit. Category 1 applies if the WBPC is subject to an established TMDL; Category 2 applies if the WBPC is on the 303(d) list, or has sufficient exceedances to be listed; and Category 3 applies if the WBPC is observed to have exceedances, but not at a sufficient frequency to be listed.

3.1 WATER BODY-POLLUTANT RECEIVING WATER LIMITATION EXCEEDANCES

Monitoring data for sites within the Upper San Gabriel River Watershed Management Area was obtained from the following sources:

- The LACFCD provides long-term monitoring data from the San Gabriel River Mass Emission Stations S14 and S13.
- LACFCD tributary monitoring sites, each operated for two years:
  - Big Dalton Wash TS13
  - Puente Creek TS14
  - San Jose Creek TS15
  - Maplewood Channel TS16
  - North Fork of Coyote Creek TS17
  - Artesia-Norwalk Drain TS18
- The Council for Watershed Health (CWH) provides monitoring data from their monitoring activities throughout the San Gabriel River Watershed.
- The California Environmental Data Exchange Network (CEDEN).
- The Los Angeles County Sanitation District (LACSD) provides long-term receiving water monitoring data.

Water quality data for the receiving waters in the EWMP area are sparse. Data received from the CWH and CEDEN largely consisted of short-term monitoring activities and many sites from these programs were only used for a single sampling event or had a limited number of constituents tested at the sites. All data were screened to identify potential WQO exceedances. A large number of available sites are for receiving waters downstream from the EWMP area. To identify the water quality priorities in the EWMP area, data reflective of receiving waters downstream from the EWMP area were considered. It is not known at this time if the MS4 discharges from the EWMP area are contributing to water quality issues observed downstream. The future monitoring, as prescribed in the CIMP, will provide a determination of whether the area is contributing to downstream exceedances of WQOs.

During dry-weather, the water bodies in the EWMP area may be hydraulically disconnected from the lower sections of the watershed due to the rapid infiltration over soft bottom channels. The monitoring performed under the CIMP will also provide information to support a determination of whether the discharges are affecting the water quality of water bodies within and downstream of the EWMP area.

The water quality data are compared to the WQBELs, where available, or the WQOs to determine if the constituent exceeds the limitations in the past five years. Based on the data review, constituents that had no observed exceedances in the past five years or would not meet the 303(d) listing criteria for impairment could potentially be delisted are identified in the prioritization process.

3.2 EWMP GROUP'S WATER QUALITY PRIORITIES

Water quality priorities for the EWMP area are based on TMDLs, 303(d) list, and monitoring data. Based on available information and data analysis, WBPCs were classified in one of the three Permit defined categories. The process for categorizing water quality priorities is summarized in the EWMP Work Plan. Category 1 if WBPCs are subject to established TMDLs, Category 2 if they are on the 303(d) list, or have sufficient exceedances to be listed, and Category 3 if there are observed exceedances but too infrequently to be listed.

Subcategories were identified and created to refine the prioritization process. Those pollutants with measurements exceeding WQOs are further evaluated and categorized based on the frequency, timing, and magnitude of exceedances. The subcategories are listed in **Table 3-1**. The WBPCs are placed in the respective subcategories in **Table 3-2**.

3.3 ADAPTIVE MANAGEMENT OF WATER BODY-POLLUTANT CATEGORIES

Constituents may change subcategories as the monitoring progresses, source investigations occur, and BMP implementation begins. Constituents for which exceedances decrease over time will be removed from the priority list and moved to the monitoring priority categories; or, removed from the priority list. If a constituent that is currently not a priority begins to exceed objectives, it would be reevaluated using the prioritization procedure, and likely increasing the priority of the constituent. Due to the natural rate of infiltration, the San Gabriel River and some of the tributaries are dry with the exception of storm flows. Future monitoring will be assessed to determine where the upper watershed is likely to be disconnected from the lower watershed during dry and minor storm events. On establishing the discontinuity, the corresponding WBPCs flagged due to downstream water quality issues will be adjusted or removed from the categorization.

Table 3-1
Details for Water Body-Pollutant Combination Subcategories

Category	Water Body-Pollutant Combinations (WBPCs)	Description
1	**Category 1A:** WBPCs with past due or current Permit term TMDL deadlines with exceedances in the past 5 years.	WBPCs with TMDLs with past due or current Permit term interim and/or final limits. These pollutants are the highest priority for the current Permit term.
	Category 1B: WBPCs with TMDL deadlines beyond the Permit term with exceedances in the past 5 years.	The Permit does not require the prioritization of TMDL interim and/or final deadlines outside of the Permit term or USEPA TMDLs, which do not have implementation schedules. To ensure EWMPs consider long term planning requirements and utilize the available compliance mechanisms these WBPCs should be considered during BMP planning and scheduling, and during CIMP development.
	Category 1C: WBPCs addressed in USEPA TMDL without a Regional Board Adopted Implementation Plan.	
	Category 1D: WBPCs with past due or current Permit term TMDL deadlines but have not exceeded in past 5 years.	WBPCs where specific actions may end up not being identified because recent exceedances have not been observed and specific actions may not be necessary. The CIMP should address these WBPCs to support future re-prioritization.
	Category 1E: WBPCs with future Permit term TMDL deadlines but have not exceeded in past 5 years.	
2	**Category 2A:** 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements with exceedances in the past 5 years.	WBPCs with confirmed impairment or exceedances of RWLs. WBPCs in a similar class[1] as those with TMDLs are identified. WBPCs currently on the 303(d) List are differentiated from those that are not to support utilization of EWMP compliance mechanisms.
	Category 2B: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements that are not a "pollutant"[2] (i.e., toxicity).	WBPCs where specific actions may not be identifiable because the cause of the impairment or exceedances is not resolved. Either routine monitoring or special studies identified in the CIMP should support identification of a "pollutant" linked to the impairment and re-prioritization in the future.
	Category 2C: 303(d) Listed WBPCs or WBPCs that meet 303(d) Listing requirements but have not exceeded in past 5 years.	WBPCs where specific actions for implementation may not be identified because recent exceedances have not been observed. Pollutants that are in a similar class[1] as those with TMDLs are identified. Routine monitoring identified in the CIMP should ensure these WBPCs are addressed to support re-prioritization in the future.
3	**Category 3A:** All other WBPCs with exceedances in the past 5 years.	Pollutants that are in a similar class[1] as those with TMDLs are identified.
	Category 3B: All other WBPCs that are not a "pollutant"[2] (i.e., toxicity).	WBPCs where specific actions may not be identifiable because the cause of the impairment is not resolved. Routine monitoring identified in the CIMP should support identification of a "pollutant" linked to the impairment and re-prioritization in the future.
	Category 3C: All other WBPCs but have not exceeded in past 5 years.	Pollutants that are in a similar class[1] as those with TMDLs are identified.
	Category 3D: WBPCs identified by the EWMP Group.	The EWMP Group may identify other WBPCs for consideration in EWMP planning.

1 Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL. (Permit pg. 49).

2 While one or more pollutants may be contributing to the impairment, it currently is not possible to identify the specific pollutant/stressor.

Table 3-2
Summary of San Gabriel River Watershed Water Body-Pollutant Categories

		Within EMWP Area								Downstream of EWMP Area		
		San Gabriel River Reach(3)		San Jose Creek Reach								
Class(1)	**Constituent(2)**	**2**	**3**	**1**	**2**	**Puente Creek**	**Walnut Creek Wash**	**North Fork of Coyote Creek**	**Coyote Creek**	**Pudding-stone Reservoir**	**San Gabriel River Reach 1**	**San Gabriel Estuary**
Category 1A: WBPCs with past due or current term TMDL deadlines with exceedances in the past 5 years.												
Metals	Copper (Dry)								I		I	I
	Copper (Wet)(4)							I	I			
	Zinc (Wet)(4)							I	I			
	Selenium (Dry)			I	I							
Category 1B: WBPCs with TMDL deadlines beyond the current Permit term and with exceedances in the past 5 years.												
Metals	Copper (Dry)								F		F	F
	Copper (Wet)(4)							F	F			
	Zinc (Wet)(4)							F	F			
	Selenium (Dry)			F	F							
Category 1C: WBPCs addressed in USEPA TMDL without an Implementation Plan												
Nutrients	Total Nitrogen									X		
	Total Phosphorus									X		
Metals	Total Mercury									X		
Legacy	Polychlorinated Biphenyl (PCB) (Sediment)									X		
	PCB (Water)									X		
	Chlordane (Sediment)									X		
	Chlordane (Water)									X		
	Dieldrin (Sediment)									X		
	Dieldrin (Water)									X		
	DDT (Sediment)									X		
	DDT (Water)									X		

Table 3-2
Continued

		Within EMWP Area								Downstream of EWMP Area		
		San Gabriel River Reach[3]		San Jose Creek Reach								
Class[1]	**Constituent[2]**	**2**	**3**	**1**	**2**	**Puente Creek**	**Walnut Creek Wash**	**North Fork of Coyote Creek**	**Coyote Creek**	**Pudding-stone Reservoir**	**San Gabriel River Reach 1**	**San Gabriel Estuary**
Category 1D: WBPCs with past due or current term deadlines without exceedances in the past 5 years.												
Metals	Lead (Wet)[5]	I	I	I	I	I	I	I	I			
Category 1E: WBPCs with TMDL deadlines beyond the current Permit term without exceedances in the past 5 years.												
Metals	Lead (Wet)[5]	F	F	F	F	F	F	F	F			
Category 2A: 303(d) Listed WBPCs with exceedances in the past 5 years.												
Bacteria	Indicator Organisms	303(d)	303(d)	303(d)	303(d)	303(d)	303(d)	303(d)	303(d)		303(d)	
Metals	Zinc		X						Dry			
	Lead				Dry				Dry			
	Selenium					303(d)		303(d)				
	Copper		X			X	X					
Legacy	Polycyclic Aromatic Hydrocarbon (PAH)	X	X	X	X							
Other	Cyanide	303(d)	X						X			
Category 2B: 303(d) Listed WBPCs that are not a "pollutant"[6] (i.e., toxicity).												
Other	Benthic-Macroinvertebrates						303(d)					
Other	DO											303(d)
Other	pH			303(d)			303(d)		303(d)		303(d)	
Other	Toxicity			303(d)					303(d)			

Table 3-2
Continued

Class[1]	Constituent[2]	Within EMWP Area								Downstream of EMWP Area		
		San Gabriel River Reach[3]		San Jose Creek Reach		Puente Creek	Walnut Creek Wash	North Fork of Coyote Creek	Coyote Creek	Pudding-stone Reservoir	San Gabriel River Reach 1	San Gabriel Estuary
		2	3	1	2							
Category 2C: 303(d) Listed WBPCs without exceedances in past 5 years.												
Nutrients	Ammonia			303(d)					303(d)			
Other	Diazinon								303(d)			
Other	2,3,7,8-TCDD (Dioxin)											303(d)
Metal	Cadmium					Wet						
	Copper			X								
	Lead					Dry	Dry					
	Zinc			X		X	X					
	Nickel								Dry			303(d)
	Mercury							X				
Salts	TDS			303(d) Dry								
Category 3A: WBPCs with exceedances in the past 5 years.												
Metal	Copper							Dry				
Other	MBAS		Wet						Wet			
Salts	Sulfate		Dry	Dry	Dry							
	Chloride		Dry	Dry	Dry				Dry			
	TDS		Dry									
Legacy	Alpha-Endosulfan								Dry			
Other	Cyanide							X				
Category 3B: WBPCs that are not a “pollutant” [6] (i.e., toxicity).												
Other	DO		X	X	X				Wet		Dry	
	pH					X		Dry				

Table 3-2
Continued

		Within EMWP Area								Downstream of EMWP Area		
		San Gabriel River Reach[3]		San Jose Creek Reach								
Class[1]	Constituent[2]	2	3	1	2	Puente Creek	Walnut Creek Wash	North Fork of Coyote Creek	Pudding-stone Reservoir	Coyote Creek	San Gabriel River Reach 1	San Gabriel Estuary
Category 3C: WBPCs with historical exceedances but none in the past 5 years.												
Other	Cyanide			X								
Metals	Selenium						X				X	X
	Lead											X
	Zinc											X
	Mercury						X					
Other	Lindane		X									

1 Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the EWMP for the TMDL.
2 WBPC listed as Wet or Dry where issue is restricted to a condition. Otherwise, WBPC is both an issue for both Wet and Dry and donated with an X
3 Data from Mass Emission Station S14 are included under San Gabriel River Reach 3 because the station is located just downstream of the reach break. TMDL and 303(d) listings historically applied to Reach 2.
4 Grouped allocation. Compliance in Coyote Creek, as measured at the Coyote Creek LTA station, is compliance for all tributaries.
5 Grouped allocation. Compliance in San Gabriel River Reach 2, as measured at the San Gabriel LTA station, is compliance for all tributaries.
6 While pollutants may be contributing to the impairment, it currently is not possible to identify the specific pollutant/stressor.
I/F Denotes where the Permit includes interim (I) and/or final (F) effluent and/or RWLs.
303(d) WBPC on the 2010 303(d) List where the listing was confirmed during data analysis.

4 Watershed Control Measures

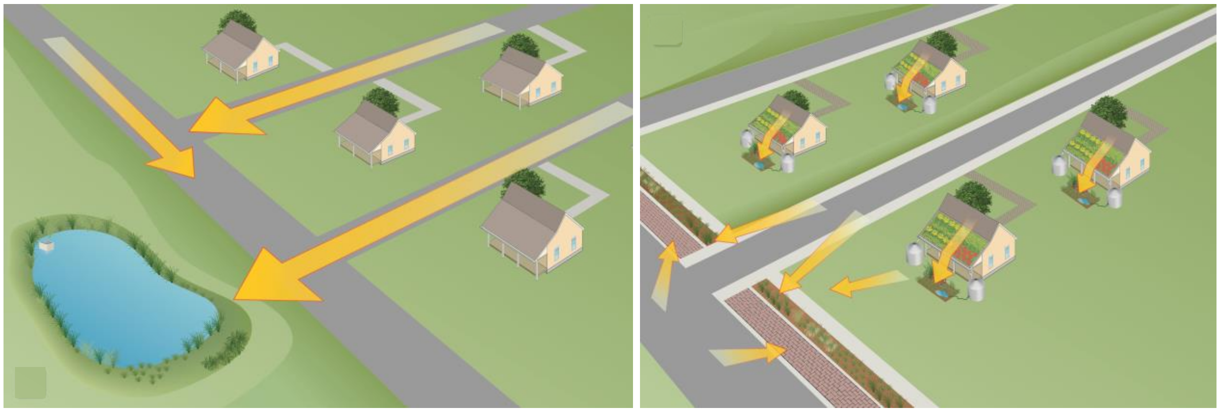
4.1 STRUCTURAL BMP CATAGORIZATION

Development of the EWMP requires identification of watershed control measures, also referred to as BMPs, that are expected to be sufficient to meet receiving water and effluent limitations set forth in the Permit. The overarching goal of BMPs in the EWMP is to reduce the impact of stormwater and non-stormwater on receiving water quality. This subsection describes efforts to develop consistent nomenclature for structural BMPs, and efforts to compile data regarding existing and planned regional BMPs.

BMPs come in two main forms, institutional and structural. Institutional BMPs, such as the minimum control measures (MCMs), comprise watershed control measures that do not fit under structural BMPs; these MCMs include street sweeping, catch basin cleaning, public education, inspection and reporting, and others. Structural BMPs are those watershed control measures that are built or installed within the watershed; the two main categories of structural BMPs to be implemented by the EWMP include regional and distributed, as follows:

- **Regional BMPs:** Constructed structural practices intended to treat runoff from a contributing area of multiple parcels (normally on the order of 10s or 100s of acres or larger) (**Figure 4-1**).
    - Regional EWMP Projects: A subset of regional BMPs that the Permit refers to as multi-benefit projects that retain (i) all non-stormwater runoff and (ii) all stormwater runoff from the 85th percentile, 24-hour storm event for the drainage areas tributary to the projects.
- **Distributed BMPs:** Constructed structural practices intended to treat runoff relatively close to the source and typically implemented at a single- or few-parcel level (normally less than one acre) (**Figure 4-1**).

Figure 4-1
Conceptual Schematic of Regional (left) and Distributed (right) BMP Implementation Approaches.



4.1.1 Structural BMP Subcategories

Regional and distributed BMPs were separated into subcategories as shown in **Table 4-1**. These categories are used herein to compile and describe information on existing, planned, and potential BMPs. Nomenclature will be important for engaging stakeholders as the EWMP is developed.

Table 4-1
Summary of Structural BMP Categories and Major Functions

Category	Subcategory	Example BMP Types
Regional	Infiltration	Surface infiltration basin, subsurface infiltration gallery
	Detention	Surface detention basin, subsurface detention gallery
	Constructed Wetland	Constructed wetland, flow-through/linear wetland
	Treatment Facility	Facilities designed to treat runoff from and return it to the receiving water or divert to the sanitary sewer.
Distributed	Site-Scale Detention	Dry detention basin, wet detention pond, detention chambers, etc.
	Green Infrastructure	Bioretention and biofiltration (vegetated practices with a soil filter media, and the latter with an underdrain)
		Permeable pavement
		Green streets (often an aggregate of bioretention/biofiltration and/or permeable pavement)
		Infiltration BMPs (non-vegetated infiltration trenches, dry wells, rock wells, etc.)
		Bioswales (vegetative filter strips and vegetated swales)
		Rainfall harvest (green roofs, cisterns, rain barrels)
	Flow-Through Treatment BMP	Media/cartridge filters, high-flow biotreatment filters, etc.
	Source Control Treatment BMPs	Catch basin inserts, screens, hydrodynamic separators, trash enclosures to mitigate stormwater coming into contact with trash, etc.

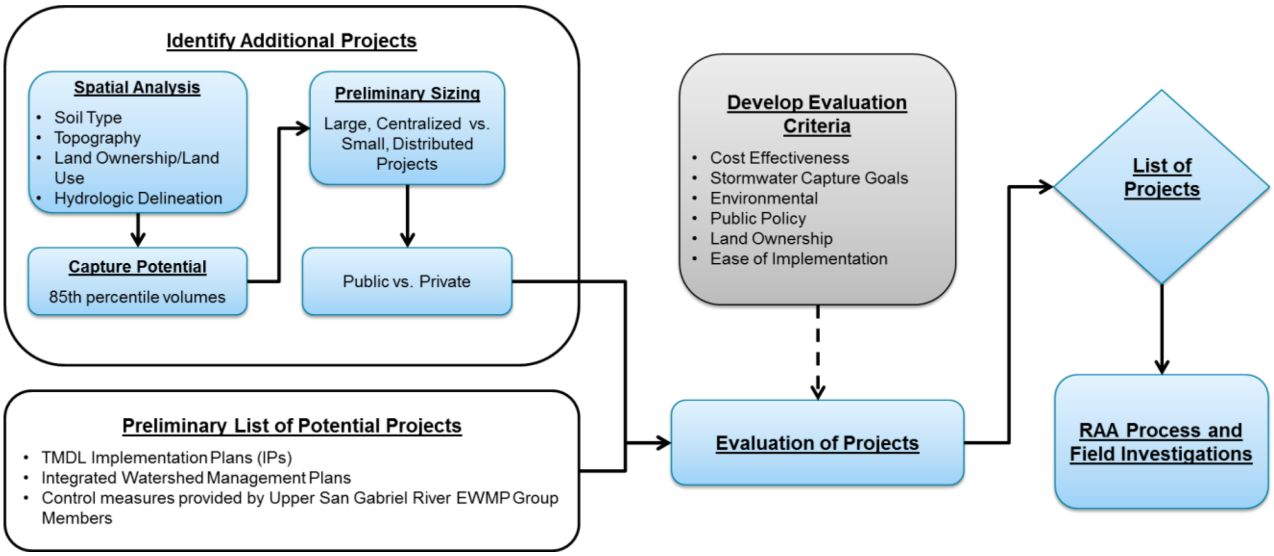
4.1.2 Existing BMPs in the EWMP Area

The EWMP Group reviewed data on existing and planned BMPs in the region during development of the EMWP Work Plan. In addition, a literature review was performed to identify further structural BMP projects that were not encompassed by the data provided. The literature review included Integrated Regional Watershed Management Plan documents and database, San Gabriel River Corridor Master Plan, Green Solution Project by Community Conservation Solutions, etc. Existing BMPs identified through the data request and literature review were then characterized according to the BMP categories defined previously. Available data on existing BMPs will be incorporated in the RAA and used to identify future opportunities for retrofit/BMP improvements.

4.2 PROCESS FOR IDENTIFYING AND EVALUATING ADDITIONAL BMPS

Additional projects will be identified and considered for further evaluation during the EWMP process. The process to identify and evaluate additional projects is illustrated schematically in **Figure 4-2** and further described in the following subsections.

Figure 4-2
Process for Identification and Evaluation of Additional Projects



4.2.1 Identification of Additional Projects

Additional BMPs will be identified using a detailed spatial analysis, beginning with an initial spatial analysis of constraints, and culminating with an identification of potentially suitable locations.

4.2.1.1 Initial Spatial Analysis

Initially, a preliminary screening will identify locations within EWMP Group's jurisdictions that can be eliminated from consideration because they are clearly unsuitable for the siting of projects. Potential constraints flaws include adverse conditions related to:

- **Soil Type.** Surface soils such as bedrock materials, clay, or other relatively impermeable substrate will prohibit the infiltration of stormwater. Locations where these conditions exist will be considered less preferable during the initial screening.

- **Topography.** Locations with slopes greater than 25 percent will be eliminated from further consideration because of the difficulty in constructing facilities in terrain with high relief. Additionally, areas in the headwaters of the watershed will be considered less preferable because of the paucity of stormwater runoff in these areas.

- **Unsuitable Land Ownership and/or Land Use Designations.** Land ownership and/or prior designation of land use of areas within the EWMP Group's jurisdictional areas that would prohibit regional projects will be considered less preferable. Areas that are owned by the federal or state government will be considered less preferable because of the difficulty of permitting maintaining projects in these areas. Other considerations will include protected open spaces or wildernesses that are less suitable for regional projects.

- **Environmental Constraints.** Environmentally restricted areas, such as superfund sites and landfills, will be deemed unsuitable during the initial screening. Areas of contaminated groundwater will need to be further evaluated to determine if recharge of stormwater causes mobilization of contaminants in the aquifer.

This initial spatial screening will result in identification of areas that may have the potential to meet the 85th percentile, 24-hour storm event capture volume requirement. These areas may be considered for further evaluation as potential regional EWMP project locations.

4.2.1.2 Capture Potential and Preliminary Sizing

Projects are sited to capture the required volume of water at selected locations along stormwater flow paths within the jurisdictional areas. A few centralized locations at lower elevations in the watershed will require larger acreage and greater infiltration capacity than numerous distributed regional facilities located higher in the watershed. The intent of the capture potential analysis is to assess the practicality of a few centralized projects and evaluate the practical requirement for a larger number of distributed projects. Using typical infiltration rates, the size of a potential project can be evaluated if the volume of water to be captured is known. The next step in the progressive spatial analysis is to perform preliminary sizing of required facilities at key locations in the watershed. This will provide information as to the practicality of larger centralized projects and distributed projects.

4.2.1.3 Analysis of Specific Project Locations

An evaluation of projects will begin with identification of specific parcels which are publically owned, such as parks, schools, flood control facilities, or other publicly-owned open spaces which may meet the area requirements identified in the evaluation of capture potential. If the number of publicly owned parcels is not sufficient to meet anticipated capture potential, privately owned parcels with large open spaces such as parking lots will be considered.

Based on this analysis of specific project locations, a list of projects will be generated to meet the objectives of the EWMP, including the potential to capture the 85^{th} percentile, 24-hour storm event. Analysis of the projects will include the parcel location, parcel size, current ownership, and necessary infiltration capacity. The list of projects generated as a result of this process will then be evaluated based on criteria developed by the EWMP Group, as described in the following section.

4.2.2 Evaluation Criteria Development

The list of potential projects will be evaluated based on criteria developed by the EWMP Group, in order to determine the projects best suited for achieving the multi-benefit objectives of the EWMP. **Table 4-2** identifies potential categories for evaluation criteria to prioritize projects and their ability to meet MS4 Permit requirements and the EWMP Group's goals. The following potential categories and considerations will be refined by the EWMP Group.

Table 4-2
Project Evaluation Criteria

Criteria Category	Considerations
Cost Effectiveness	Life Cycle Cost Capital Cost Operations and Maintenance Cost Funding Options (Grants, State Revolving Funds, other funding)
Stormwater Capture Goals	Capacity or Volume of Water Captured Water Quality Groundwater Recharge/Infiltration Capacity Geographical Location
Environmental	Environmental Constraints Reduced Energy Consumption Consumption of Other Resources Multi-use benefits Impact on habitat or species
Public Policy Institutional Issues	Political Constraints Education/Outreach Political Support Partnerships
Land Ownership	Public vs. Private Land Acquisition Impediments
Ease of Implementation	Permitting Schedules (short term vs. long term) Constructability Site Accessibility

4.2.3 Ranking Potential Projects

The list of potential projects will be ranked in accordance with the evaluation criteria described above and refined. Initially, ranking by category will be relatively simple, using qualitative weighting descriptions such as “favorable”, “moderately favorable”, and “not favorable”. More quantitative criteria and weighting factors will be developed if necessary and if more quantitative data becomes available. Projects will be further evaluated through the RAA and field investigations as necessary.

4.3 MINIMUM CONTROL MEASURES / INSTITUTIONAL BMPS

Group Members are continuing to implement the MCMs required under the 2001 MS4 Permit. Applicable new MCMs will be implemented by the time the EWMP is approved by the Regional Board. During the EWMP development, Group Members may consider modifications to the MCMs based on RAA results. Rational for any proposed modification of an MCM activity will be provided in the EWMP.

5 Reasonable Assurance Analysis Approach

A key element of the EWMP is the RAA, which is used to demonstrate "that the activities and control measures…will achieve applicable WQBELs and/or RWLs with compliance deadlines during the Permit term" (Section C.5.b.iv.(5), page 63). While the Permit prescribes the RAA as a quantitative demonstration that control measures will be effective, the RAA also promotes a modeling process to identify and prioritize potential control measures to be implemented by the EWMP Group. In other words, the RAA not only demonstrates the cumulative effectiveness of BMPs to be implemented, it also supports their selection. Furthermore, the RAA considers the applicable compliance dates and milestones for attainment of the WQBELs and RWLs, and therefore supports BMP scheduling. The methodology for the RAA effort described herein will likely evolve over the course of EWMP development.

5.1 MODELING SYSTEM TO BE USED FOR THE RAA

The Watershed Management Modeling System (WMMS) will be used to support the RAA. WMMS is specified in the Permit as a potential tool to conduct the RAA. The LACFCD, through a joint effort with United States Environmental Protection Agency (USEPA), developed WMMS specifically to support informed decisions associated with managing stormwater. The ultimate goal of WMMS is to identify cost-effective water quality improvement projects through an integrated, watershed-based approach. The WMMS encompasses Los Angeles County's coastal watersheds of approximately 3,100 square miles, representing 2,566 subwatersheds (**Figure 5-2**). As described in the following subsections, WMMS is a modeling system that incorporates three tools: (1) the watershed model for prediction of long-term hydrology and pollutant loading, (2) a BMP model, and (3) a BMP optimization tool to support regional, cost-effective planning efforts. A version of WMMS is available for public download from Los Angeles County Department of Public Works website. A total of 258 subwatersheds in the EWMP Group area are represented by WMMS (**Figure 5-3**). To support evaluation of regional BMPs, these subwatersheds will be further grouped by "pour point" to receiving waters.

The version of WMMS to be used for the EWMP Group has been enhanced/modified in several ways, including:

- Updates to meteorological records to represent the last 10 years and to allow for simulation of the design storm;
- Calibration adjustments to incorporate the most recent 10 years of water quality data collected at the San Gabriel River and Coyote Creek mass emission stations;
- Enhancements to the watershed model to allow for simulation of non-structural BMPs;
- Enhancements to the System for Urban Stormwater Treatment and Analysis Integration (SUSTAIN) to allow for representation of an expanded/modified BMP network;
- Application of a second-tier of BMP optimization using SUSTAIN, which replaces the Nonlinearity-Interval Mapping Scheme (NIMS) component of WMMS.
- Optimization of BMP effectiveness for removal of bacteria pollutant (rather than metals only); and
- Updates to Geographic Information Systems (GIS) layers, as available.

5.2 WATERSHED MODEL - LSPC

The watershed model included within WMMS is the Loading Simulation Program C++ (LSPC) (Tetra Tech and USEPA 2002; USEPA 2003; Shen et al. 2004). LSPC is a watershed modeling system for simulating watershed hydrology, erosion, and water quality processes, as well as in-stream transport processes. LSPC also integrates a GIS, comprehensive data storage and management capabilities, and a data analysis/post-processing system into a convenient Windows-based environment. The algorithms of LSPC are identical to a subset of those in the Hydrologic Simulation Program–FORTRAN (HSPF) model with selected additions, such as algorithms to dynamically address land use change over time. Another advantage of LSPC is that there is no inherent limit to the size and resolution of the model that can be developed, making it an attractive option for modeling the Los Angeles region watersheds. USEPA's Office of Research and Development first made LSPC available as a component of USEPA's National TMDL Toolbox (http://www.epa.gov/athens/wwqtsc/index.html). LSPC has been further enhanced with expanded capabilities since its original public release.

The WMMS development effort culminated in a comprehensive watershed model of the entire Los Angeles County area that includes the unique hydrology and hydraulics features and characterizes water quality loading, fate, and transport for all of the key TMDL constituents (Tetra Tech 2010a, 2010b). The 258 subwatersheds in the EWMP area that are represented by WMMS are shown in **Figure 5-3**.

5.3 SMALL-SCALE BMP MODEL – SUSTAIN

SUSTAIN was developed by the USEPA to support practitioners in developing cost-effective management plans for municipal stormwater programs and evaluating and selecting BMPs to achieve water quality goals (USEPA, 2009). It was specifically developed as a decision-support system for selection and placement of BMPs at strategic locations in urban watersheds. It includes a process-based continuous simulation BMP module for representing flow and pollutant transport routing through various types of structural BMPs. Users are given the option to select from various algorithms for certain processes (e.g., flow routing, infiltration, etc.) depending on available data, consistency with coupled modeling assumptions, and the level of detail required. **Figure 5-1** shows images from the SUSTAIN model user interface depicting some of the available BMP simulation options in a watershed context.

Figure 5-1
SUSTAIN Model Interface Illustrating BMP Opportunities in Watershed Settings

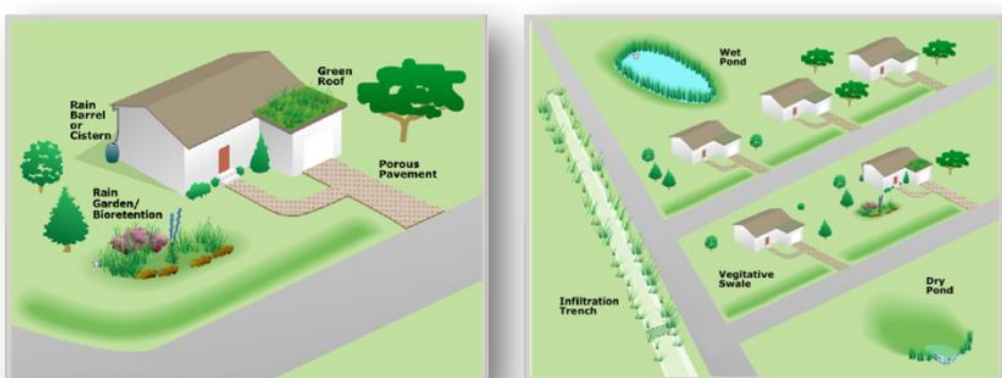
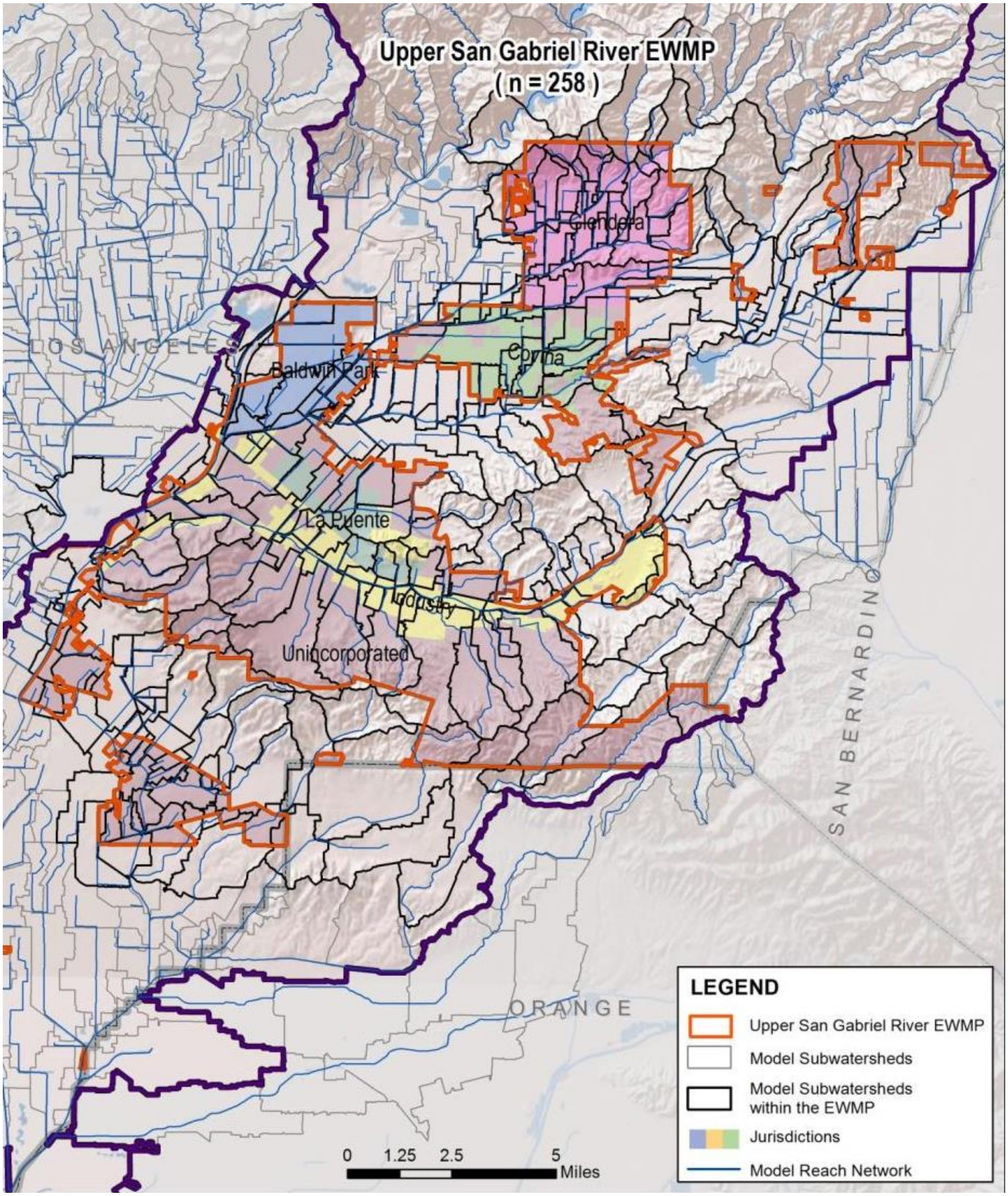


Figure 5-2
WMMS Model Domain and Represented Land Uses, Soil Types, and Slopes by Subwatershed

Figure 5-3
EWMP Group Area and 258 Subwatersheds Represented by WMMS



SUSTAIN extends the capabilities and functionality of traditionally available models by providing integrated analysis of water quantity, quality, and cost factors. The SUSTAIN model in WMMS includes a cost database comprised of typical BMP component cost data from a number of published sources including BMPs constructed and maintained in Los Angeles County. SUSTAIN considers certain BMP properties as "decision variables," meaning that they are allowed to change within a given range during model simulation to support BMP selection and placement optimization. As BMP size changes, so do cost and performance. SUSTAIN runs iteratively to generate a cost-effectiveness curve comprised of optimized BMP combinations within the modeled study area (e.g., the model evaluates the optimal width and depth of certain BMPs to determine the most cost-effective configurations for planning purposes).

5.4 LARGE-SCALE BMP OPTIMIZATION TOOL – NIMS

WMMS was specifically designed to dynamically evaluate effectiveness of BMPs implemented in subwatersheds for conforming to downstream RWLs while optimizing cost-benefit. The structural BMP strategies included in WMMS primarily focus on (1) distributed green infrastructure and (2) large regional BMPs. With the number of alternative combinations of BMPs possible in a watershed, the ability to evaluate and compare the benefits and costs of each scenario (representing a combination of multiple BMPs) is highly desirable. As such, WMMS employs optimization based on NIMS to navigate through the many potential scenarios of BMP strategies and identify the strategies that are the most cost-effective (Zou et al., 2010). It is noted, however, that optimization at the jurisdictional level (rather than watershed-wide) is not currently achieved with NIMS. As such, a two-tiered optimization approach with SUSTAIN (subwatershed-scale and watershed-scale) may be used instead of NIMS for the RAA.

5.5 REVIEW OF THE RAA PROCESS AND ELEMENTS

The proposed RAA approach is a predictive quantitative process that includes the following components as represented on **Figure 5-4**:

1. **Incorporates water quality priorities and identifies Numeric Goals to address them** (step 1): Numeric Goals, which represent RAA drivers, include TMDL targets, WQBELs, and RWLs. The estimated baseline/existing loading provides a reference point of comparison for measuring BMP performance and cost-effectiveness (i.e. the difference between the current loading and predicted loading after BMPs are implemented, and the cost of those BMPs). The term "Numeric Goals" encompasses the necessary load- and/or volume-based reductions to achieve the applicable WQBELs, RWLs, and milestones.

2. **Identifies opportunities for BMP implementation in the EWMP area** (step 2): the RAA inherently includes an exploratory element for evaluating BMP opportunities. The opportunities include BMPs under construction (committed BMPs), BMPs in planning stages (proposed BMPs), and additional BMPs identified through the iterative modeling process (potential BMPs).

3. **Evaluates effectiveness of potential BMPs on receiving water quality and jurisdictional loading** (step 3): EWMPs are ultimately developed as "recipes for compliance" for each jurisdiction, but compliance is also assessed in the receiving waters. As such, assessment of the effectiveness of BMP scenarios requires consideration of averaging/simulation periods and determination of points where load reductions will be assessed.

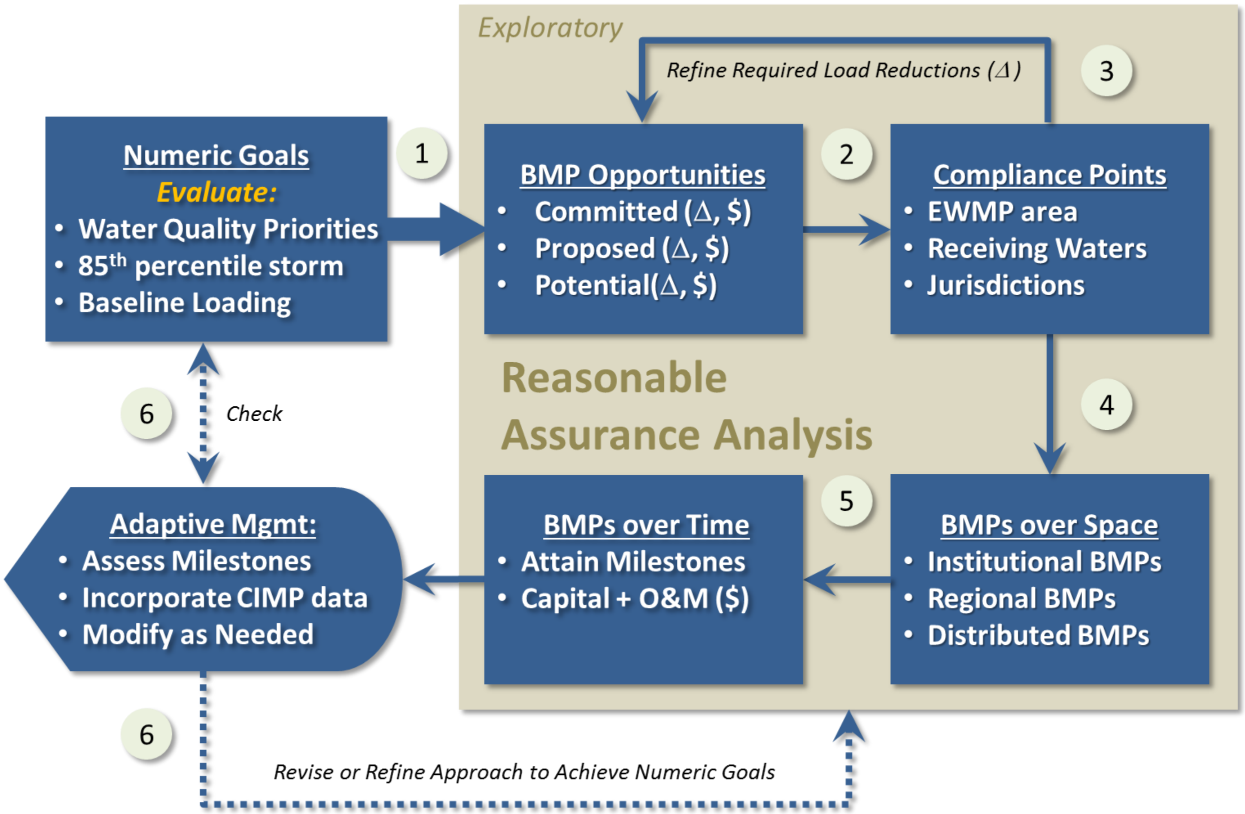
4. **Identifies the combination of BMPs expected to attain Numeric Goals** (step 4): the RAA will be an iterative process that evaluates different combinations of BMPs and quantify their effectiveness. It is through the iterative modeling process that certain practices will be prioritized for inclusion in the EWMP.

5. **Supports scheduling to implement the BMPs over a timeline that addresses milestones cost-effectively** (step 5): practices that offer the greatest immediate benefit for the lowest cost would be among those first identified and included in the early implementation phases. Furthermore, the

schedule by which BMPs are implemented will be dictated by applicable TMDL and EWMP milestones.

An overview of these steps in the proposed RAA process is described in the following subsections.

Figure 5-4
Conceptual Diagram of RAA Components



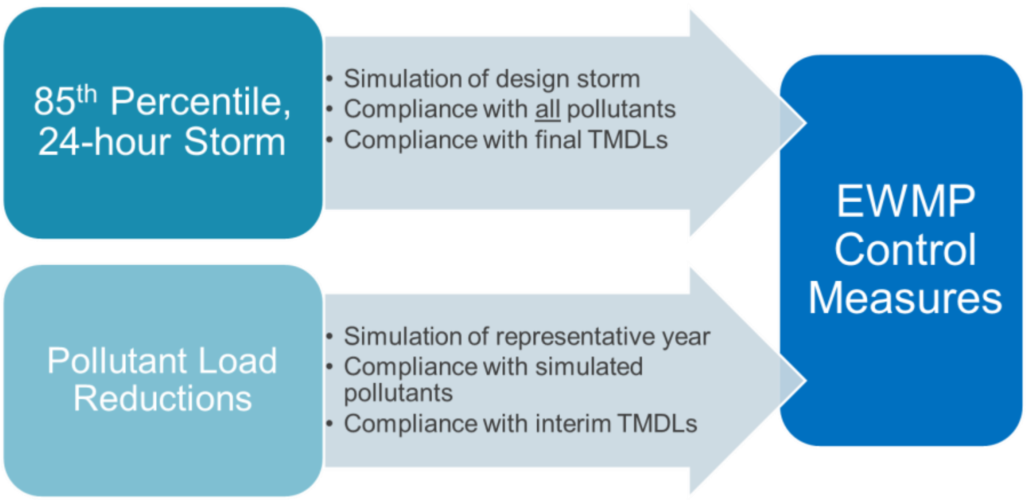
5.5.1 Establishing Numeric Goals to Achieve Water Quality Priorities (Step 1)

The water quality priorities are the primary driver of the EWMP and its proposed BMPs. The Permit provides two types of numeric goals for addressing water quality priorities (see **Figure 5-5**):

- Volume-based: retain the standard runoff volume from the 85th percentile, 24-hour storm
- Load-based: achieve the necessary pollutant load reductions to attain RWLs or WQBELs

The term "Numeric Goals" encompasses the necessary load- and/or volume-based reductions to achieve the applicable WQBELs, RWLs, and other regulatory limits. At this time, the difference in these two compliance paths in terms of BMP implementation costs is unknown. As such, early in the RAA process, both types of Numeric Goals will be evaluated. During this process, some combination of the two compliance paths may be selected to achieve the water quality priorities identified.

Figure 5-5
Two Types of Numeric Goals and EWMP Compliance Paths



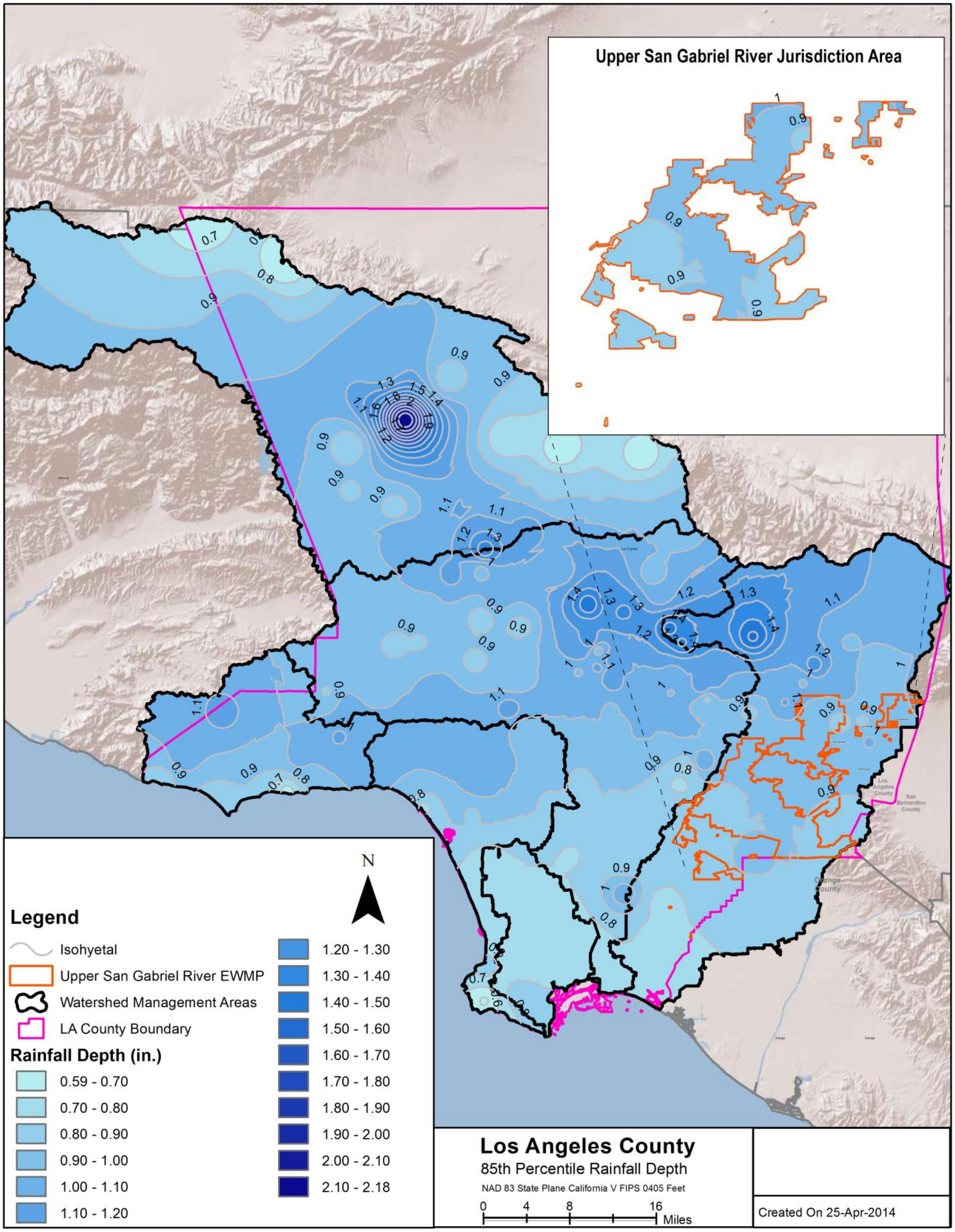
5.5.1.1 Numeric Goals based on 85th Percentile, 24-hour Storm Volume

The volume associated with the 85th percentile, 24-hour storm varies by subwatershed. Each of the 258 subwatersheds in the EWMP Group area will have a unique volume, due to varying rainfall amounts and land characteristics (imperviousness, soils, slope, etc.). Shown in **Figure 5-6** are the rainfall depths associated with the 85th percentile, 24-hour storm. These rainfall amounts will be used as boundary conditions in the LSPC watershed model, in order to predict the associated runoff volumes for each of the 258 subwatersheds in the EWMP area. Capture of these runoff volumes could potentially be attained with distributed BMPs, not just regional EWMP projects.

5.5.1.2 Numeric Goals based on Pollutant Load Reductions

The numeric goals based on pollutant load reductions are derived from WQBELs and RWLs. The required pollutant load reduction is the difference between current/baseline loading and the loading predicted to attain the WQBELs and RWLs. The baseline loading will be calculated for each water quality priority pollutant by simulating the hydrology and water quality that occurred during a representative year from the previous 10 years. The simulation will be performed at an hourly time step. The representative year will be selected as an early step in the RAA process, based on review of rainfall characteristics of the last 10 water years of rainfall data.

Figure 5-6
Rainfall Depths Associated with the 85th Percentile, 24-Hour Storm.



The load-based numeric goals will assume each Group Member is held to the same percent load reduction goal for the critical pollutant associated with the compliance point of concern. With each Group Member held to the same load reduction percentage, this ensures (1) the overall net load reduction for the entire watershed is consistent with the required TMDL reduction, and (2) that each contributing Group Member does an equal amount of effort to achieve this goal relative to the loads originating from their jurisdiction. The result is that Group Members with higher existing loads also have more loads to reduce in order to achieve the same percent reduction as Group Members with lower existing loads.

The EWMP will prescribe responsibilities for each Group Member and, as such, a GIS analysis will be performed to support determination of the EWMP areas within each Group Member’s jurisdiction. Parcels with facilities subject to general or individual industrial NPDES permits will be extracted prior to determination of baseline loading. Other parcels outside of Group Members’ jurisdiction may also be excluded, including state- and federally-owned land as well as Caltrans’ land. Modifications to the model spatial domain are described in more detail in Section 5.1.

The pollutants included in the water quality priorities for the EWMP are listed in **Table 5-1**, along with modeling approved for the RAA. The LSPC watershed model in WMMS includes modules for modeling sediment, metals, bacteria, and nutrients modeling. Pollutants in the water qualities priorities that do not fall directly into these modules will be indirectly modeled by associating them with a surrogate pollutant to which they are typically associated within the environment. For example, certain toxic and legacy pollutants are typically associated with sediment, and therefore sediment reductions will be associated with toxics/legacy pollutant reductions.

The RAA will include many pollutants, yet it is likely that one or two will be the limiting pollutant(s). Achieving the numeric goal applicable to those pollutants (through BMP implementation) will result in other pollutants also meeting their numeric goals. An analysis will be performed to determine which of the pollutants in **Table 5-1** are the limiting pollutant(s).

Table 5-1
Approach for Modeling Water Quality Priority Pollutants

Group	Pollutant	Modeled LSPC Pollutant Category ● Directly modeled ○ Indirectly modeled				
		Sediment [1]	Flow	Metals	Nutrients	Bacteria
Metals	Copper			●		
	Lead			●		
	Zinc			●		
	Silver [2]			○		
	Selenium [2]			○		
	Nickel [2]			○		
	Mercury [2]			○		
Nutrients	Total Nitrogen				●	
	Total Phosphorus				●	
	Ammonia [3]				○	
Bacteria	Indicator bacteria [4]					●
Salts	TDS [5]		○			
	Sulfate [5]		○			
	Chloride [5]		○			
Legacy	PCB	○				
	Chlordane	○				
	Dieldrin	○				
	DDT	○				
	PAHs	○				
Other	Cyanide	○				
	Benthic macroinvertebrates	○				
	pH	n/a				
	Toxicity	○				
	Dissolved oxygen [6]				○	
	Diazinon	○				
	Dioxin	○				
	Lindane	○				

1 For pollutants that are sediment-associated, the reduction in sediment loading will be associated with corresponding reductions in pollutant loading, based on available regional monitoring data and/or literature.
2 Selenium, mercury, silver and nickel will either be associated with a modeled metal (copper, zinc, lead) or the reduction will be associated with reductions in sediment or volume.
3 Modeled indirectly through total nitrogen.
4 Modeled indicator bacteria as fecal coliform.
5 For salts, the reduction in non-stormwater and stormwater volume will be associated with corresponding estimated reductions in salts based on available monitoring data, literature, and/or potable water supply data.
6 Modeled indirectly through total phosphorous.
n/a pH will not be directly modeled.

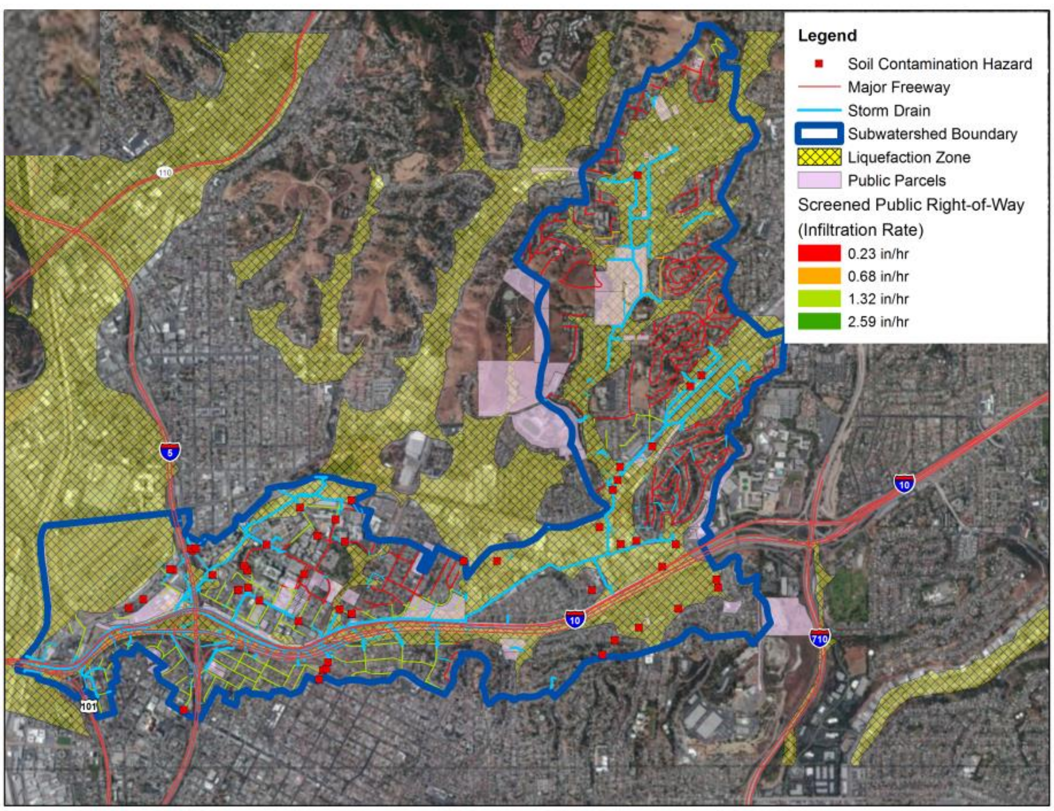
5.5.2 Identifying Opportunities for BMP Implementation (Step 2)

Opportunities for BMP implementation are driven by locations where BMPs are feasible/desirable. Screening criteria such as slope and existing soil contamination (based on the State of California's Geotracker database will be used to exclude areas where BMP implementation is less feasible. This step in the RAA process includes the following analyses:

- **Distributed BMPs:** the RAA process will include a desktop GIS analysis to identify roads, public parcels and rights-of-way (**Figure 5-7**), including LACFCD rights-of-way. The potential capacity available for distributed BMPs will be determined for each of the 258 subwatersheds (one capacity per subwatershed), based on the GIS screening. For example, the capacity available for green streets will be assessed based on the estimated length and width of roads in each subwatershed that meet the screening criteria.
- **Regional BMPs:** the process for identifying regional BMPs (including Regional EWMP Projects) is described in Section 4.2. The WMMS model will be used iteratively to assess the effect of potential Regional EWMP Projects, and evaluate which additional BMPs are needed.

Overall, the results of the BMP screening determines the capacity available on public parcels and rights-of-way for BMP deployment, and ultimately the amount of private land acquisition necessary (if any) to provide additional BMP capacity.

Figure 5-7
Example of GIS Data Used to Screen for Regional and Distributed BMP Opportunities



5.5.3 Evaluating Effectiveness of Potential BMPs (Step 3)

BMP performance varies according to multiple factors including BMP type, location, size to drainage area ratio, contributing area imperviousness, etc. The customized WMMS will be used to explore scenarios for BMPs to be included in the EWMP, including the following:

- **Institutional BMPs:** using the LSPC watershed model, the potential effectiveness of new or enhanced institutional BMPs, including enhanced street sweeping, enhanced irrigation control, and brake pad replacement will be quantified. In addition, a small percent will be assumed to apply to all other "non-modeled" institutional BMP enhancements.
- **Distributed BMPs:** using the SUSTAIN BMP model, the potential effectiveness of distributed BMPs on volume reduction and pollutant loading from each of the 258 subwatersheds in the EWMP Group area will be assessed.
- **Regional BMPs:** using the LSPC watershed model, the potential effectiveness of Regional EWMP Projects identified through the regional BMP selection process will be quantified. A generalized approach to incorporating Regional EWMP Projects into the RAA process is shown in **Figure 5-8**.

An illustration of using WMMS to identify required BMP capacities at the watershed-scale is shown in **Figure 5-9**. The figure shows the interaction between compliance points, distributed BMP capacities, and decisions on regional BMPs.

Figure 5-8
Generalized Process for Incorporating Regional EWMP Projects into the RAA

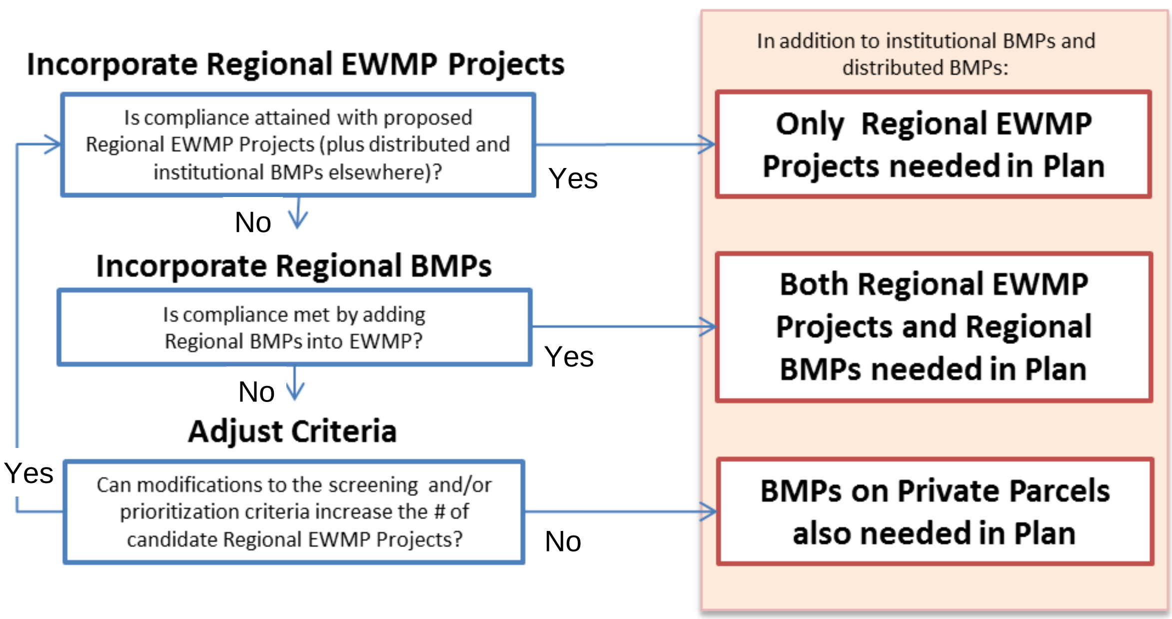
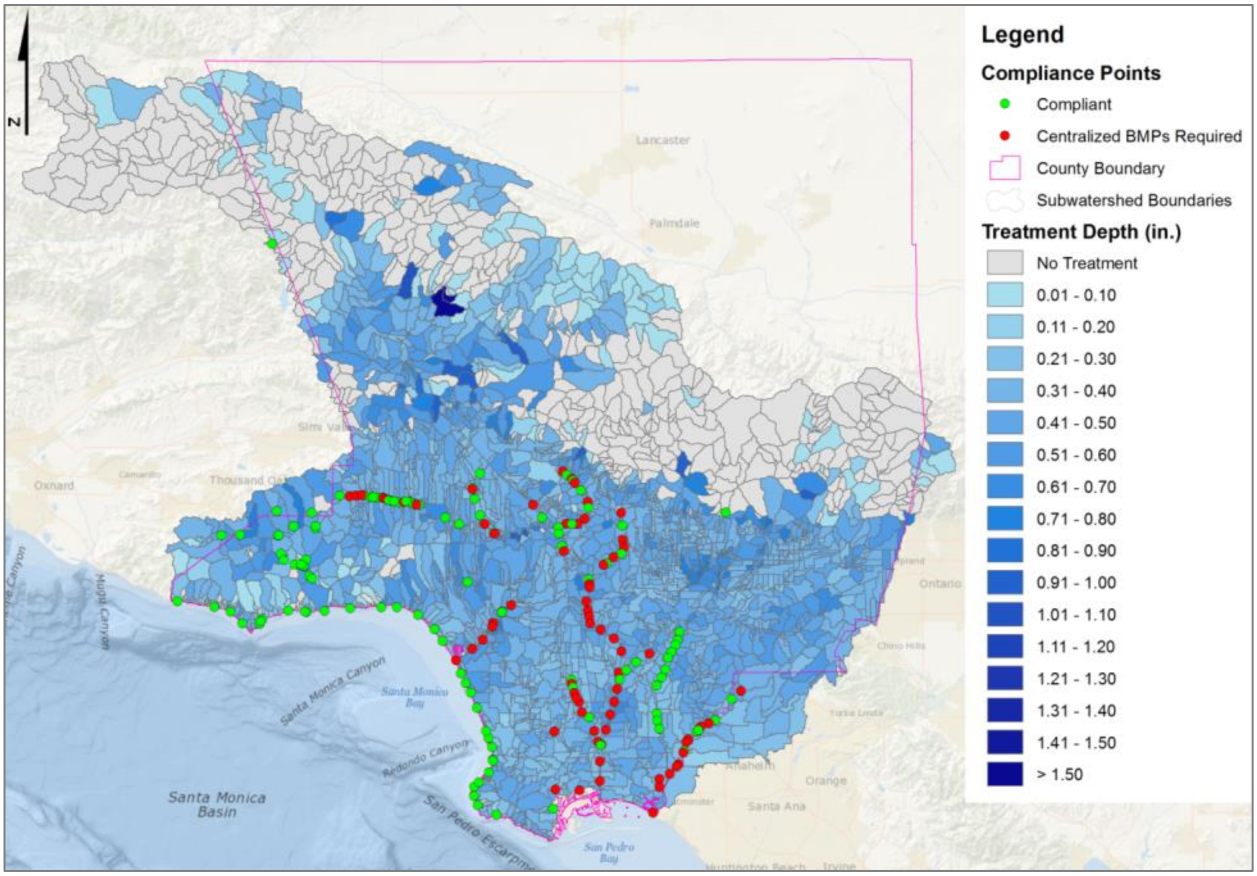


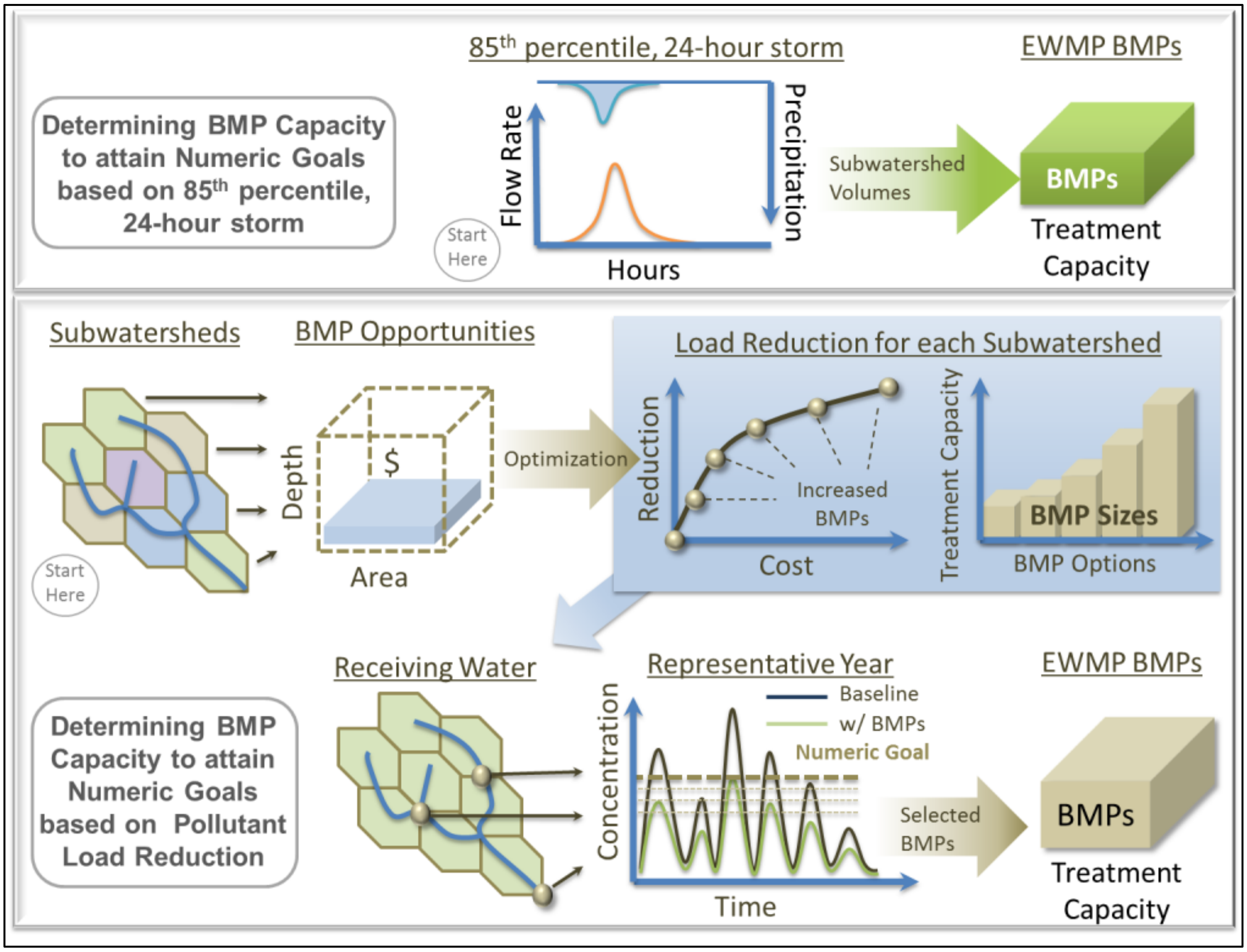
Figure 5-9
Hypothetical WMMS Output Showing BMP Capacities by Subwatershed and Linkage to Receiving Water Conditions



This hypothetical output shows the relationship between modeled BMP capacities and receiving water conditions. The shading of the subwatersheds shows the capacity of distributed BMPs (darker blue indicates more BMP capacity to be implemented). The dots indicate whether RWLs are attained (green is attainment, red is non-attainment). In cases where red dots are shown, the output indicates that additional BMPs are required upstream to attain RWLs. For the EWMP, the in-stream compliance points will be those defined by TMDLs.

The process for determining the necessary cumulative BMP capacity for both distributed and regional BMPs in each of the 258 subwatersheds in the EWMP Group area depends on the type of numeric goal being addressed. As shown in **Figure 5-10**, the necessary BMP capacity is determined through a design storm analysis of volume-based (85th percentile storm) approach. For the load-based (pollutant reduction) approach, the analysis is more intensive and will consider in-stream assessment points to optimize load-reduction BMPs. Attainment of load-based Numeric Goals will be evaluated based on (1) analysis of the subwatershed loadings and opportunities and (2) linkage to receiving water conditions through simulation of the representative year. The BMP treatment capacities determined to be needed will drive the number and type of BMPs selected for inclusion in the EWMP, as described in the next subsection. A key factor for selecting those BMPs is the preferences among the different BMP types.

Figure 5-10
Illustration of Process for Determining Required BMP Capacities for the EWMP Using Volume-Based (top panel) and Load-Based (bottom panel) Numeric Goals



Generalized BMP preferences (based on cost effectiveness) for the RAA are shown in **Figure 5-11**. Notice the diminishing returns of load reduction associated with each additional BMP effort moving up the curve. These default preferences will be modified on a case-by-case basis, using the BMP Preferences Survey filled out by each Group Member. Some Group Members may choose to implement a BMP type, while others do not. The generalized approach to BMP preferences includes the following:

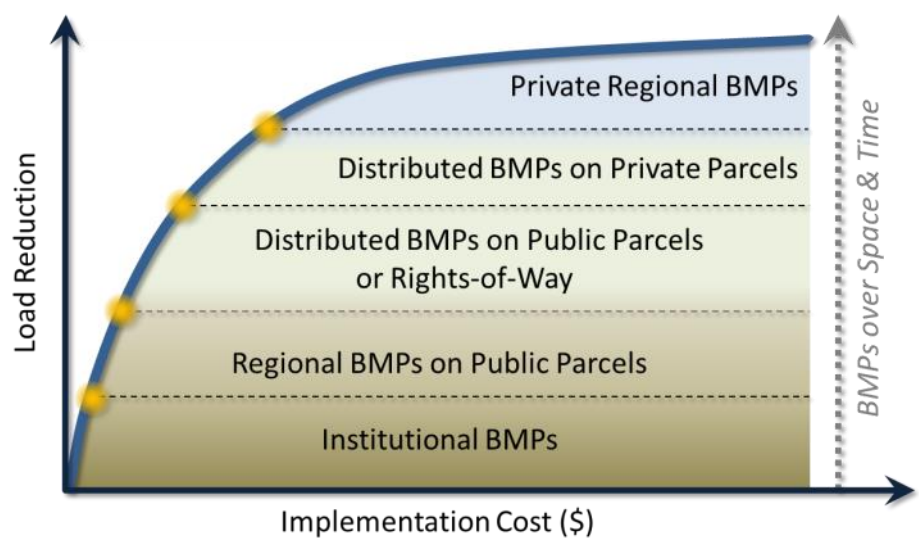
- **Minimum control measures and other institutional BMPs** (such as street sweeping) often reduce flows and/or pollutants with little capital cost. Enhancement of institutional BMPs can provide an immediate load reduction at a relatively low cost. However, implementation of institutional BMPs often requires coordination with multiple departments within a municipality/agency.
- The preference of distributed versus regional BMPs is determined on a case-by-case basis.
    - **Regional BMPs** located on public parcels are often preferred because (1) there are no land acquisition costs, (2) publicly-owned land has no barriers for maintenance, and (3) regional facilities offer economies-of-scale in terms of treated drainage area. However, while they may have the lowest cost per pollutant load reduced, regional BMPs are also generally the most expensive individual projects. Finally, the regional BMPs that qualify as Regional EWMP Projects will be preferred due to their advantage of achieving

multiple benefits, such as water quality improvement, groundwater supply augmentation, and recreational and aesthetic benefits.

- **Distributed BMPs** may be preferred because (1) they can often be implemented in the rights-of-way, (2) they often have multiple benefits including green infrastructure (e.g., green streets) improving aesthetics and enhancing property values, and (3) the costs for individual projects are less than regional BMPs. However, depending on available area, opportunities for these practices may be limited, thereby reducing overall load reduction relative to regional BMPs. Also, it may take more time to treat the volume that regional BMPs can treat because so many *individual* projects must be completed.

There will likely be locations where the BMP capacity on public parcels is insufficient to attain the Numeric Goals, and BMP sites on private land will need to be incorporated into the EWMP. BMPs on private land will be avoided to the extent possible. However, where needed to support compliance, they will be slated for deployment later in the EWMP implementation schedule as described in Section 5.5.5.

Figure 5-11
Generalized Preferences for BMP Types to be Incorporated into the RAA and EWMP



5.5.4 Identify the Combination of BMPs Expected to Attain Numeric Goals (Step 4)

The iterative RAA process will ultimately result in combinations of BMPs predicted by the customized WMMS to cost-effectively attain the numeric goals. As shown in **Table 5-2** and **Table 5-3**, an RAA output for an individual numeric goal will present BMPs in the following manner:

- **Individual Jurisdictions:** each Group Member will have its own set of BMPs to attain the numeric goals (**Table 5-2**). In addition, each Group Member will receive a detail BMP "recipe" for each subwatershed within its jurisdiction.
- **Regional BMPs:** the regional BMPs, including Regional EWMP Projects selected by the EWMP Group according to the decision process, will be included. In the EWMP, these BMPs will be identified with details on location (cross streets) and concepts for the projects (capacity, footprint, etc.).
- **Distributed BMPs:** for each Group Member and each of the 258 subwatersheds, a total treatment capacity ("treatment depth" because it is expressed in inches of runoff) to be achieved by distributed BMPs will be identified. Within that treatment capacity, recommendations for the types of distributed BMPs to implement will be provided. Group Members will have the

flexibility to substitute one type of distributed BMP for another type, as long as the total treatment capacity is achieved for the subwatershed (**Table 5-3**). The model identifies the capacities of distributed BMPs needed in each of the 258 subwatersheds, but does not identify specific locations (cross streets) for the distributed BMPs within a subwatershed. Also, there may be opportunities to leverage low impact development (LID) ordinances to achieve some distributed BMP capacity on private land (implemented by private developers).

- **Institutional BMPs:** for EWMP Group Members that choose to implement the modeled institutional BMPs (enhanced street sweeping, enhanced irrigation control, or brake pad replacement), those enhanced BMPs will be highlighted in the RAA output. In addition, a small percent will be assumed to apply to all other non-modeled institutional BMP enhancements.

A unique set of BMPs will be identified for each final TMDL and TMDL/EWMP milestones that occur in the next two Permit cycles. Because EPA TMDLs, Category 2 water quality priorities, and Category 3 water quality priorities do not have adopted TMDL implementation schedules, the EWMP shall propose milestones to address them. In contrast, TMDL milestones that occur more than two Permit cycles in the future (but prior to the final TMDL compliance dates) will not be considered to the same level of detail. This BMP sequencing process is described in the next subsection.

Table 5-2
Hypothetical Example RAA Output for One Set of Numeric Goals, for the Entire EWMP Area (one row per jurisdiction)

Jurisdiction	Total Number of Regional BMPs	Total Capacity of Distributed BMPs				Institutional BMPs/MCMs	
		Treatment Depth (inches)	Green Streets (feet)	Bioretention (feet^3)	LID on private (feet^3)	Enhanced Irrigation ordinances	Enhanced sweeping
Glendora	6	0.54	884,323	662,676	421,567	●	
Covina	3	0.37	97,634	88,954	14,623		●
Industry	2	0.34	56,534	47,453	7,890	●	
La Puente							
Baldwin Park							
County	4	0.48	297,634	188,954	114,623		●

Table 5-3
Hypothetical Example RAA Output for One Set of Numeric Goals for an Individual Jurisdiction (one row per subwatershed)

Jurisdictional Sub-area (sub-watershed)	Total Number of Regional BMPs	Total Capacity of Distributed BMPs				Institutional BMPs/MCMs	
		Treatment Depth (inches)	Green Streets (feet)	Bioretention (feet^3)	LID on private (feet^3)	Enhanced Irrigation ordinances	Enhanced sweeping
1	1	0.54	4,323	676	567	●	
2	0	0	0	0	0	●	
3	1	0.24	534	453	890	●	
4	2	0	0	0	0	●	
.							
.							
258	0	0.68	8,634	4,954	3,623	●	

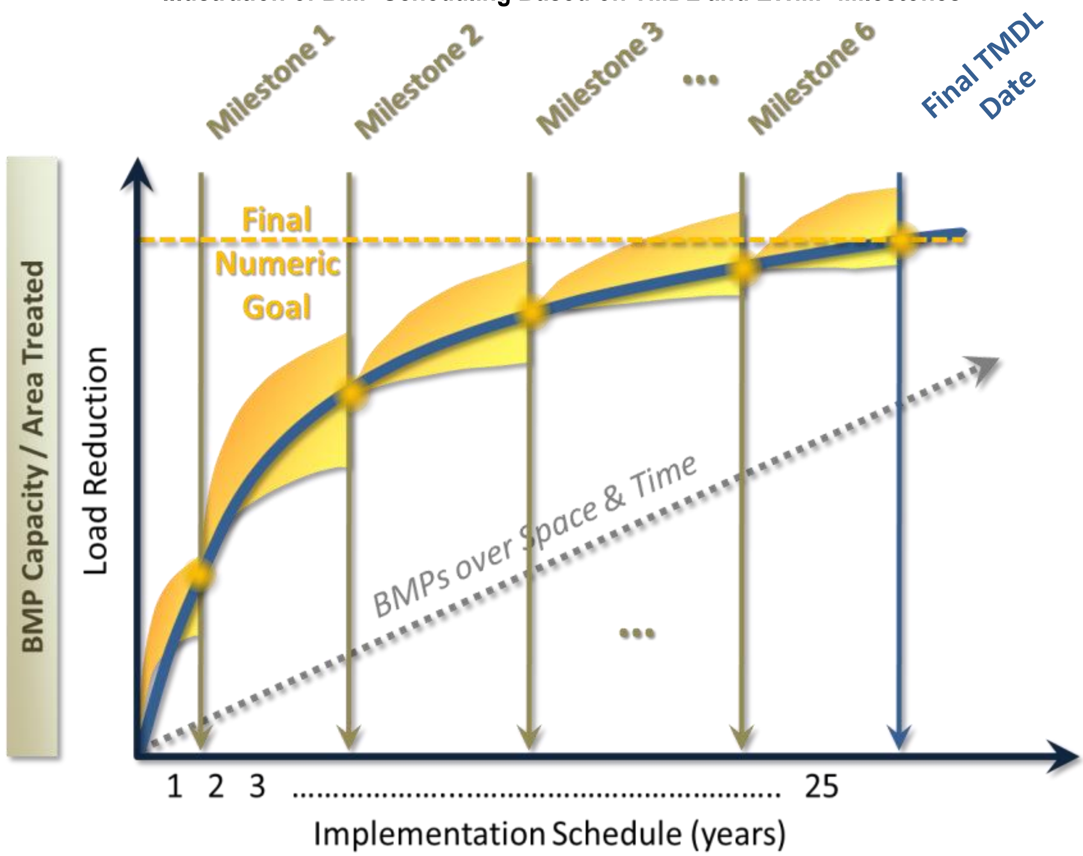
The BMP numbers, types, capacities and locations are completely hypothetical, for illustration purposes only. Note the output (bottom) is separated into 258 subwatersheds. This type of output will be generated each final TMDL and TMDL/EWMP milestones that occur in the next two Permit cycles.

5.5.5 Using the RAA to Support BMP Scheduling (Step 5)

The final TMDL and EWMP milestones establish the schedule by which BMPs must be implemented. Traditionally, the approach of TMDL implementation plans has been focused on final TMDL compliance, whereas the Permit compliance paths offered to EWMPs increase emphasis on milestones. For each final TMDL and EWMP milestone that occurs in the next two Permit cycles, the combination of BMPs expected to result in attainment of the corresponding Numeric Goals will be identified. An illustration of the BMP scheduling to account for milestones is shown in **Figure 5-12**.

The TMDL milestones for the EWMP Group are shown in **Table 5-4**, which illustrates the potentially complicated sequence based on multiple pollutants. The limiting pollutant analysis will be important for establishing the pace of BMPs. Furthermore, dry weather milestones tend to occur earlier in the schedule than wet weather milestones. Because the structural BMPs implemented for wet weather will also be relied on for dry weather reductions, the scheduling to attain dry weather milestones may be dependent on those for wet weather milestones. It is important to note that **Table 5-4** does not show the EWMP milestones (for Category 2 and 3 water quality priorities), which will be established during the development of the EWMP.

Figure 5-12
Illustration of BMP Scheduling Based on TMDL and EWMP Milestones



A unique set of BMPs will be generated for each final TMDL and EWMP milestone that occurs in the next two Permit cycles. The width of the yellow bands represents the relative cumulative BMP capacity to be constructed over the course of each milestone period. The BMPs being implemented during early versus late milestones will likely reflect the BMP preferences shown in **Figure 5-11** (i.e., BMPs on private land will be implemented late in the schedule).

Table 5-4
Schedule of TMDL Milestones for the EWMP

TMDL	Compliance Goal	Weather Condition	Compliance Dates and Compliance Milestone													
			(Bolded numbers indicated milestone deadlines within the current Permit term) [1]													
			2012	**2013**	**2014**	**2015**	**2016**	2017	2020	2023	2024	2026	2028	2030	2032	2036
San Gabriel River Metals and Impaired Tributaries Metals and Selenium TMDL	% of MS4 area Meets WQBELs	Dry						30%	70%	100%						
		Wet						10%	35%	65%		100%				
Dominguez Channel and Greater Los Angeles and Long Beach Harbor Water Toxic Pollutants TMDL	Meet WQBELs	All	12/28												3/23	
			Interim												Final	
Los Angeles Area Lakes TMDLs for Puddingstone Reservoir and Santa Fe Dam Park Lake	Meet WLAs	All	USEPA TMDLs, which do not contain interim milestones or implementation schedule. The Permit (Part VI.E.3.c, pg. 145) allows MS4 Permittees to propose a schedule in the EWMP.													

[1] The Permit term is assumed to be five years from the Permit effective date or December 27, 2017.

5.6 SUMMARY

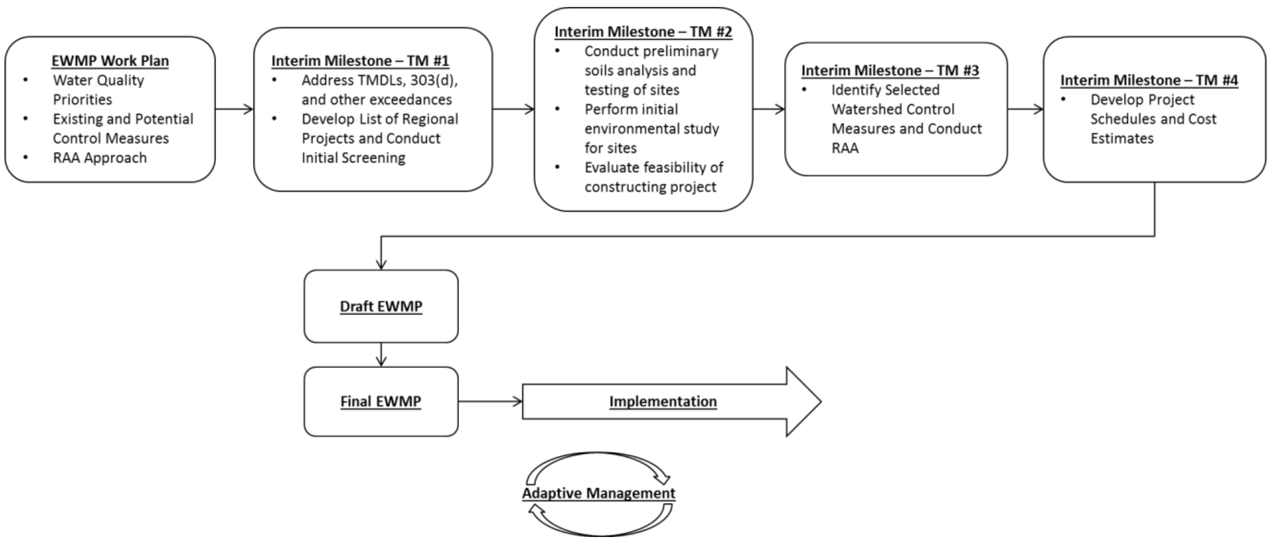
The previous efforts used to develop WMMS will be built upon to develop the RAA for the EWMP Group. In general, the RAAs for EWMPs will likely establish a new state of science for modeling BMPs on watershed scales. The EWMPs will drive innovative approaches for using models to select BMPs to address water quality priorities based on an array of pollutants over implementation schedules that differ by pollutant. The EWMP Group may also choose to update the RAA to support adaptive management as additional monitoring data are collected and watershed condtions and regulatory requirements change. The RAA developed for the EWMP Group will include detailed appendices to document the methods and assumptions used to select BMPs and demonstrate the BMPs will be effective. In addition, the RAA Guidelines from the Regional Board will be used to guide the modeling approaches and methods.

6 EWMP Development

6.1 PROCESS FOR DEVELOPING THE EWMP

This section describes the process to complete the EWMP. During the course of developing the EWMP, interim technical memoranda will be developed to ensure timely completion of the EWMP. **Figure 6-1** below presents the process for developing the EWMP and interim milestones. The schedule for completion of interim milestones and the EWMP is presented in Section 6.2.

Figure 6-1
EWMP Development Process



Additionally, the EWMP is intended to be an adaptive plan that is capable of adjusting and adapting to new information, including data collection as part of the CIMP implementation. As a result, an adaptive management process will occur every two years following approval of the EWMP. The adaptive management process is discussed in Section 6.3.

6.2 EWMP SCHEDULE AND MILESTONES

The Notice of Intent (NOI) submitted to the Regional Board on June 26, 2013 provided a schedule of interim milestones for the development of the EWMP Work Plan, CIMP, and EWMP. At this time the EWMP Group does not anticipate any deviations from the schedule. Completed milestones and projected completion dates for future milestones as identified in the NOI are presented in **Table 6-1**.

Table 6-1
EWMP Schedule of Interim and Final Milestones

Milestone	Due Dates
EWMP Work Plan	
EWMP Work Plan Technical Memos • Identification of water quality priorities • Existing and future watershed control measures, identification of potential Regional EWMP Projects • Reasonable assurance analysis approach • Best Management Practices selection approaches	February 2014
Complete Internal Draft EWMP Work Plan	April 2014
Submit Final Draft EWMP Work Plan	June 2014
CIMP	
CIMP Technical Memos • Outfall and receiving water monitoring approach • Monitoring sites selection • New development and redevelopment effectiveness tracking	March 2014
Complete Internal Draft CIMP	April 2014
Submit Final Draft CIMP	June 2014
EWMP	
Technical Memos • GIS analyses and screening • Various components of RAA • Approach to U.S. Environmental Protection Agency TMDLs, 303(d) listings, other exceedances of Receiving Water Limitations • Final selection of Regional EWMP Projects • Preliminary soil analysis and testing of sites • Feasibility analyses of Regional EWMP Projects, customization of Minimum Control Measures, identification of other BMPs • Project schedules and cost estimates	April 2014 to March 2015
Complete Internal Draft EWMP	May 2015
Submit Final Draft EWMP	June 2015

6.3 ADAPTIVE MANAGEMENT PROCESS

The EWMP is intended to be implemented as an adaptive program. As new program elements are implemented and information is gathered over time, the EWMP will undergo modifications to reflect the most current understanding of the watershed and present a sound approach to addressing changing conditions. As such, the EWMP will employ an adaptive management process that will allow the EWMP to evolve over time.

Part VI.C.8 of the Permit details the adaptive management process to be included in the EWMP that includes the following requirements:

i. Permittees shall adapt the EWMP to become more effective every two years from the date of program approval based on, but not limited to a consideration of:
   (1) progress toward achieving WQBELs and/or RWLs;
   (2) Permittee monitoring data;
   (3) achievement of interim milestones;
   (4) re-evaluation of water quality priorities and source assessment;
   (5) non-Permittee monitoring data;
   (6) Regional Board recommendations; and
   (7) recommendations through a public participation process.

ii. Permittees shall report any modifications to the EWMP in the annual report.

iii. Permittees shall implement any modifications to the EWMP upon approval by the Regional Board or within 60 days of submittal if the Regional Board expresses no objections.

The adaptations to the EWMP as called for in the adaptive management process essentially include a re-evaluation of water quality priorities, an updated source assessment, and an effectiveness assessment of watershed control measures. The CIMP will gather additional data on receiving water conditions and stormwater/non-stormwater quality to inform these analyses. This process will be repeated every two years as part of the adaptive management process.

6.3.1 Re-characterization of Water Quality Priorities

Water quality within the EWMP Area will be re-characterized using data collected as a result of the CIMP implementation to include the most recent data available. Water body-pollutant combination classifications may be updated as a result of changing water quality. These classifications will be important for refocusing improvement efforts and informing the selection of future watershed control measures.

6.3.2 Source Assessment Re-evaluation

The assessment of possible sources of water quality constituents will be re-evaluated based on new information from the CIMP implementation efforts. The identification of non-MS4 and MS4 pollutant sources is an essential component of the EWMP because it determines whether the source can be controlled by watershed control measures. As further monitoring is conducted and potential sources are better understood, the assessment becomes more accurate and informed.

6.3.3 Effectiveness Assessment of Watershed Control Measures

The evaluation of BMP effectiveness is an important part of the adaptive management process and the overall EWMP. Implementation of the CIMP can provide a quantitative assessment of structural BMP effectiveness as it relates to actual pollutant load reduction to determine how selected BMPs have performed at addressing established water quality priorities. Effectiveness assessment becomes important for the selection of future control measures to be considered.

7 References

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Attachment A

Los Angeles County Flood Control District (LACFCD) Background Information

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT (LACFCD) BACKGROUND INFORMATION

In 1915, the Los Angeles County Flood Control Act established the LACFCD and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers, the LACFCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The system also controls debris, collects surface stormwater from streets, and replenishes groundwater with stormwater and imported and recycled waters. The LACFCD covers the 2,753 square-mile portion of Los Angeles County south of the east-west projection of Avenue S, excluding Catalina Island. It is a special district governed by the County of Los Angeles Board of Supervisors, and its functions are carried out by the Los Angeles County Department of Public Works. The LACFCD service area is shown in **Figure A-1.**

Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The permittees that have such land use authority are responsible under the MS4 Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites. (Permit, Part II.E, p. 17.)

The MS4 Permit language clarifies the unique role of the LACFCD in stormwater management programs: "[g]iven the LACFCD's limited land use authority, it is appropriate for the LACFCD to have a separate and uniquely-tailored stormwater management program. Accordingly, the stormwater management program minimum control measures imposed on the LACFCD in Part VI.D of this Order differ in some ways from the minimum control measures imposed on other permittees. Namely, aside from its own properties and facilities, the LACFCD is not subject to the Industrial/Commercial Facilities Program, the Planning and Land Development Program, and the Development Construction Program. However, as a discharger of storm and non-stormwater, the LACFCD remains subject to the Public Information and Participation Program [(PIPP)] and the Illicit Connections and Illicit Discharges Elimination Program. Further, as the owner and operator of certain properties, facilities and infrastructure, the LACFCD remains subject to requirements of a Public Agency Activities Program." (Permit, Part II.F**,** p. 18.)

Consistent with the role and responsibilities of the LACFCD under the Permit, the EWMPs and CIMPs reflect the opportunities that are available for the LACFCD to collaborate with permittees having land use authority over the subject watershed area. In some instances, the opportunities are minimal; however, the LACFCD remains responsible for compliance with certain aspects of the MS4 permit as discussed above.

In some instances, in recognition of the increased efficiency of implementing certain programs regionally, the LACFCD has committed to responsibilities above and beyond its obligations under the 2012 Permit. For example, although under the 2012 Permit the PIPP is a responsibility of each permittee, the LACFCD is committed to implementing certain regional elements of the PIPP on behalf of all permittees at no cost to the permittees. These regional elements include:

- Maintaining a countywide hotline (888-CLEAN-LA) and website (www.888cleanla.com) for public reporting and general stormwater management information at an estimated annual cost of $250,000. Each permittee can utilize this hotline and website for public reporting within its jurisdiction.
- Broadcasting public service announcements and conducting regional advertising campaigns at an estimated annual cost of $750,000.

- Facilitating the dissemination of public education and activity specific-stormwater pollution prevention materials at an estimated annual cost of $100,000.
- Maintaining a stormwater website at an estimated annual cost of $10,000.

The LACFCD will implement these elements on behalf of all permittees starting July 2015 and through the Permit term. With the LACFCD handling these elements regionally, permittees can better focus on implementing local or watershed-specific programs, including student education and community events, to fully satisfy the PIPP requirements of the 2012 Permit.

Similarly, although water quality monitoring is a responsibility of each permittee under the 2012 Permit, the LACFCD is committed to implement certain regional elements of the monitoring program. Specifically, the LACFCD will continue to conduct monitoring at the seven existing mass emissions stations required under the previous Permit. The LACFCD will also participate in the Southern California Stormwater Monitoring Coalition's Regional Bioassessment Program on behalf of all permittees. By taking on these additional responsibilities, the LACFCD wishes to increase the efficiency and effectiveness of these programs.

Figure A-1
Los Angeles County Flood Control District Service Area

Figure A-2
Los Angeles County Flood Control District Area in USGR EWMP Group